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Epidemiologic Implications of Wartime Population Shifts*

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IT is impossible to discuss at this time epidemiological implications of the convulsive shifts of population precipitated by total warfare in Europe and Asia. Adequate information is not available. From meager reports which have filtered through the censored press, it can be inferred that pestilential diseases—typhus, cholera, malaria, dysentery—have taken a tremendous toll of military and civilian populations in the devastated and impoverished countries which have been sucked into the maelstrom. The end will not come with cessation of hostilities. It will wait upon reconstruction of stabilized governments and communities.

Our concern on this occasion is with the danger to our own people from infectious disease as a result of disturbances due to the war. The United States has been preparing for this struggle with gradually increasing tempo during the past two years. Cities on the North American continent have not yet experienced the horrors of being bombed and invaded. Nevertheless, great changes in the distribution of population and conditions of living have already taken place and are continuing. These changes are brought about by movements of three different kinds: (1) by migration of able-bodied men of military age from every walk of life and section of the country into induction and training centers of the Army and Navy; (2) by evacuation of civilian population groups from areas of military importance; and (3) by migration of workers and their families into boom towns adjacent to military and industrial establishments. Each has its peculiar epidemiological implications.

With regard to the first, the increased risk from infectious disease to recruits is a phenomenon well known since the dawn of history in all military undertakings. It is the primary concern of the medical and sanitary officers of the Army and the Navy. For the purposes of this discussion it suffices to state that in the mobilization of the armed forces of the United States for this war the experience up to the present has been far more favorable than was anticipated

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on the basis of what happened in 1917–1918. With the construction of vast training establishments and the organization of medical facilities rapidly approaching completion, the period of greatest danger from the common infectious diseases would seem to be past. No serious epidemic has yet affected an Army and Navy of more than five million men.

With regard to the second, the evacuation of civil populations from limited areas for military reasons, there has been little experience so far. About 40,000 Japanese families are in process of being removed from the Pacific coastal area and re-settled in the interior of the country. The acquisition of land for military establishments and for training purposes, has required the dispossession and removal of some 10,000 native American families from limited areas widely distributed over the country but particularly in the southern states. These movements, however, are insignificant in comparison with what would happen if the threat of bombing and invasion became imminent. Such an eventuality must be considered.

Some idea of the epidemiologic implications of mass evacuations can be gained from an examination of what has happened in England. Even before the war actually began, the threat to civil communities was realized and plans were formulated. Air raid precautions demanded the evacuation of mothers and children from large industrial cities to the small towns and rural districts. Naturally, considerable anxiety was expressed that this movement might precipitate epidemics of diphtheria, scarlet fever, cerebrospinal meningitis, poliomyelitis, or other dangerous acute infectious disease. The following is an excerpt from an editorial which appeared in the *Lancet*,[1] just after hostilities had begun between Germany and England:

> The complications of evacuation cannot yet be foreseen. In the hospitals they seem likely to amount to no more than inconveniences. Among the children the risk of infection cannot be denied. Children from crowded cities, which may be considered as permanent epidemic centres of the common infectious diseases, are carrying specific organisms into rural districts which may be, but often are not, permanent epidemic areas for those same organisms. The result will depend not so much on whence the emigrants came as on where they have gone, and the risk, where there is any, is much less to the evacuees than to those on whom they are billeted. The transference from one place to another will not necessarily disturb the epidemic equilibrium provided there is no overcrowding and the two places are in a similar epidemic state. Thus, if Portsmouth is evacuated into Bournemouth without overcrowding, Bournemouth has nothing to fear—a comparable migration takes place every year at holiday time and nothing usually happens. Where the children are sent to small circumscribed towns such as Ipswich, the effect may be different, for if such a town has been free from any one of the endemic infections for some time the immunity of the residents will be low and the risk of infection correspondingly high. Town children sent to isolated rural districts may then be expected to set up epidemic situations among the native population, severe if there is much increase in the population density, troublesome and lingering if the newcomers are well scattered. The risks of diseases not spread by droplets will depend mainly on the state of sanitation, and here again the sparsely populated rural district is the most likely to suffer.

In addition to this editorial there were a series of letters addressed to the Editor of the *Medical Officer*,[2] a journal for medical men in the government and municipal services, predicting that unless proper precautions were taken, or even in spite of precautions, the evacuation would precipitate a considerable increase in the incidence of infectious diseases.

The Air Raid Precautions Plan divided England and Wales into three types of areas:

(1) Evacuation Areas—Whole cities or zones in certain cities from which selected groups of the population were to be moved

(2) Reception Areas—Small towns and rural districts into which these groups were temporarily billeted
(3) Neutral Areas—Those which were left relatively undisturbed

During the first week of September, 1939, when war was imminent, 1,270,000 mothers, children, and cripples were evacuated—including in the number three-quarters of a million school children—truly a mass migration. The school population in the evacuated areas decreased by approximately three-eighths, and that of the reception areas was increased by about one-third. Hundreds of thousands of rural homes had new inmates; many day, special, and nursery schools became residential schools. Overcrowding of living conditions was inevitable. Pressure of time did not permit many of the precautionary measures which had been thought necessary.

What effect this mass evacuation had upon the morbidity and mortality rates of England and Wales is still not entirely clear. Under the conditions which prevail, it is impossible to maintain undisturbed the level of completeness of reporting. The size and character of the shifting populations at risk in different geographic areas cannot be enumerated, but only roughly estimated. Pressure of war activity prevents field studies. Only crude analyses can be made. Some idea of what happened can be obtained from a few reports which have been published.

During the four months immediately following the evacuation from London, according to Glover,[3] the incidence of diphtheria and scarlet fever *decreased* two-thirds and of poliomyelitis one-third, as compared with the same quarter in the previous year. The deaths from scarlet fever were 27 per cent *less;* from diphtheria, 16 per cent *less;* from diarrhea and enteritis under 2 years of age, 27 per cent *less.* The experience with all of the other common communicable diseases was similarly favorable, and there were no epidemics of unusual infections.

More recently Stocks [4] has analyzed this experience in more detail, extending the observations through the following year, to the end of 1940. Using official morbidity reports and making certain assumptions with regard to the changes in the population census of the affected areas, he drew two broad inferences: (1) Removal of some 30 per cent of the children under 15 from evacuation towns, coupled with closure of the schools, was followed by a fall of 40 per cent or more in the rate of diphtheria *among the children who remained,* compared with (a fall of) 9 per cent in the neutral areas, by the first quarter of 1940. (2) Influx of children drawn from these towns *to the reception areas,* with consequent increase in their population at ages under 15 by about 30 per cent, was followed by an immediate rise of diphtheria *among the native children* amounting to 60 or 70 per cent, as measured by notifications, but the rate in the whole population of children in these areas (visitor and native) *declined* again within 6 months to its original level. The effect upon the scarlet fever rate was similar but more lasting.

The data upon which Stocks bases his inferences are questionable but, granting their validity, the effect of this mass evacuation upon the increased incidence of the common communicable diseases among the native populations fell happily short of the predictions and there have been no unusual epidemics of serious magnitude.

In the United States it has been the *third* kind of population movement which has been of importance up to the present time—*the migration of labor.* The movement of people in search of gold, money, and work is not a new phenomenon in this country, particularly in the north central and western

states, but this war has brought about a tremendous acceleration and changed the direction of the currents. The direction of flow is the reverse of that which has been discussed in connection with the evacuation of military areas. It is from country to city, from farming to industrial communities, from scattered to crowded living conditions. Employment services estimate that 600,000 workers will leave the farm in 1942. Thus, in a sense, the *rural districts have become evacuation areas* and *certain towns and cities have become reception areas.*

Boom towns are not a new phenomenon in the United States, especially in the West, but they have been created during the past two years at a rate that is staggering even to the miracle builders of Hollywood. With the amazingly rapid construction and expansion of military establishments and of manufacturing plants all over the country, peaceful villages have been converted into bustling centers of activity. New towns have sprung up almost overnight. Great stabilized cities and their environs have become whirlpools of human exchange. Many have doubled their populations in the past two years. An increase of 25 to 50 per cent in the total number of employables is not unusual. It is important to note that the movement has been one of *adults* to a greater extent than of children. Some workers have brought their families with them; others have left their children at home in care of relatives.

The migratory war workers have been living in tents, trailers, dormitories, barracks, warehouses, basements, and attics. Families have shared homes, apartments, even beds. Crowding in many areas has become intense. Provisions for more adequate housing are going forward rapidly, but some time must elapse before the shortage is overcome.

What are the epidemiologic implications of such situations?

An experience to which I would like to direct attention is that of Halifax,[5] Nova Scotia. Before the beginning of hostilities, this was a relatively unimportant center of commerce with a stabilized population of about 60,000. With the opening of war in 1938, as in 1917–1918, it became an exceedingly important port. The civilian population increased rapidly with the arrival of thousands of workers and their families. The military garrison was greatly strengthened. There was a constant stream of transients with the arrival and departure of convoys. The epidemiologic implications are evident—crowding, a shifting immunity status, and the possibility of introduction of new strains of parasitic microörganisms from Europe or elsewhere.

For ten years previous to the war, diphtheria had prevailed in that city endemically at a low level. There had been no active campaign to immunize the child population artificially. Schick surveys made in 1940–1941 indicated that 80 per cent of selected groups of adults, as well as of the children, were susceptible.

In September, 1940, cases of unusual severity appeared. Apparently a new and virulent strain of *Corynebacterium diphtheriae* had been introduced. The number of cases reported rose rapidly to reach twenty times the expected incidence during the next three months, attacking adults even more frequently than children. In the civilian population 588 cases were reported, and 303 cases occurred in the military forces. As a result of aggressive measures by the health authorities and medical profession, the epidemic declined somewhat but the disease continued to prevail at a high level throughout the following year and indeed up to the present time. During the same period there have been reported in this city some 600 cases of

scarlet fever and more than 100 cases of epidemic meningitis. Since early in the current year the situation has improved.

This exemplifies the experience of a city in which the epidemiologically expected happened. By way of contrast, I should like to refer to that of a similar urban industrial maritime situation in which it has not.

Previous to the beginning of war preparation, the combined population of the Norfolk-Newport News (Va.) area amounted to about 350,000. With the development of industrial, military, and naval establishments, it has become one of the most important centers on the coast. In two years the population in this area has been almost doubled. Epidemic potentialities have developed similar to those noted for Halifax so far as the housing shortage, crowded living conditions, changing immunity status, and the constant mixing of transient and native populations are concerned. In addition, there has been an acute water shortage. Rationing of water has been necessary for some months, and relief through bringing in a new supply is not expected until the latter part of the current year. In spite of these conditions, up to the present time no significant increase in the infectious diseases has been reported.

The experience of the Norfolk-Newport News area is not unusual. In many other cities and towns conditions which might be classified as epidemiologically dangerous have developed. The surprising fact is that, in spite of the crowding of people into these reception areas and the disturbance of living conditions during the past two years, there has been little, if any, increase in the incidence of infectious disease. For this increase to be sufficiently great in a limited population group and time interval to merit recognition as an "epidemic" requires the fortuitous coincidence of a complex mosaic of factors, only a few of which are known and many a matter of speculation. This is the hazard of epidemiological prediction.

By way of explaining the unexpectedly favorable experience of both civil and military populations thus far, certain generalizations deserve consideration. The population shifts have occurred with gradually accelerating tempo. There have been as yet no convulsive evacuations such as those which occurred when the countries of Europe were engulfed in war with lightning-like rapidity. The start was made from a position more favorable than has ever been realized before by any great nation in the health and welfare of its people. This country has been realizing dividends on the last quarter-century of intensive public health organization. For example, the conquest of intestinal infections, especially typhoid and dysentery, by environmental sanitation has depleted the human reservoir of infection. The frequency of healthy carriers of intestinal pathogens per unit of population has greatly decreased. The risk from drinking a public water supply contaminated with human sewage is by no means as great as it was. The public, and those who plan for the public, have been educated and are aware as no people previously have been of the fundamental necessity of maintaining public health and sanitary safeguards. Artificial immunization against smallpox, diphtheria, and typhoid fever protect a far larger proportion of the people than before. The venereal infections, gonorrhea and syphilis, have received extensive attention and constitute a special problem which need not be discussed here.

There remain, however, certain respiratory infections whose spread cannot be prevented and against which there is available no means of artificial immunization, as those caused by viruses such as measles, chickenpox, mumps, and the influenza group, and

by bacteria such as pneumococci, hemolytic streptococci (Group A), and meningococci. These thrive where humanity is crowded together. Is the absence of epidemics from these infections among adult populations temporary and fortuitous, or due to factors which are of a more or less permanent character? If the latter, is it due to (a) earlier and more widespread acquisition of immunity to the prevailing strains through clinical or subclinical attack, (b) conditions of living and of personal hygiene which are less favorable to parasitic propagation, (c) some change in the prevailing strains modified in the direction of lower pathogenicity, or (d) some combination of those factors?

With regard to the first hypothesis, it is notable that since the World War of 1917–1918, with the advent of the family automobile, extension of good roads, auto busses and aeroplanes, and such institutions as the "consolidated school" and the "movie," there has been a remarkable change in the frequency and range of human contacts in this country. In the modern United States few communities can any longer be considered isolated in any real sense of the word. Exposure to common infections must be at an earlier age and relatively fewer persons escape attack in childhood.

Some indication that such a change is actually taking place is suggested by a statistical analysis of the age distribution of reported cases of measles in Maryland. Measles is an example of a common infection to which everyone is exposed sooner or later. To compensate for differences in the completeness of reporting, the attack rate at each age was expressed as a ratio of the attack rate at all ages. The specific age ratios for Baltimore, representing an urban community, were compared with those for the rest of Maryland, predominantly rural. It was found that children in the city are still (1935–1940) attacked at an earlier age than are those living in the rural part of Maryland, but the age of attack among children living in the rural areas today is almost the same as that of the children who lived in the city before the last war (1917–1918).

These data are limited, but they lend support to the conception (1) that the changes in living conditions of the past quarter-century have tended to accelerate and broaden the antigenic experience of the younger generation, and (2) that a greater proportion of the young adults who enter camp and industrial areas are immune to common infections. On the other hand, it is difficult to reconcile this concept of earlier and more intensive natural immunization with the observed fact that the trend in the death rate among children from infectious diseases has been progressively downward during recent years.

During this same period an increasing proportion of the public have acquired better habits of personal hygiene. Promiscuous spitting, sneezing, and coughing in public places have been reduced. The use of paper drinking cups has become popular. Greater cleanliness in the methods of handling and serving foods is demanded. Housing and ventilation have been improved. These and other changes in the hygiene of living have had a definite, though immeasurable, effect in reducing the volume and rate of exchange of respiratory pathogens. Finally, and perhaps most important of all, it must be borne in mind that lowered infectivity and pathogenicity of the prevailing strains may be the important factor. If so, the introduction of new strains may take place at any time and lead to increased morbidity and mortality from respiratory infections.

Since the relative importance of these and other unknown factors can-

not be evaluated, only time will tell. The balance between the human host and certain of these parasites may already have been disturbed to an extent that a downward or stationary trend has been converted into a rise. Not yet apparent in the form of epidemics, it will be reflected first in the rates of endemic incidence.

Within the last two years there has been a definite increase in the incidence of cerebrospinal meningitis—a disease which is a sensitive indicator of the effect of population shifts and crowding. In England and Wales the reported cases were as follows: 1938, 1,288 cases; 1939, 1,500 cases; 1940, 12,500 cases.[6] In spite of a lowered case fatality rate due to chemotherapy, the deaths from cerebrospinal fever in the first two years of the war, up to the third quarter of 1941, were about four times as numerous on the average of the years as in 1938–1939.[7] In the United States this disease has shown a definite increase since the first of this year. Up to the week ended June 27, the total number of cases reported to the Surgeon General of the U. S. Public Health Service was greater than for a similar period in any year since 1937. Significantly, the increase appeared in the Eastern Seaboard states — Massachusetts, New York, Pennsylvania, New Jersey, Maryland, the District of Columbia and Virginia—and in California, the industrial areas into which people have been crowding.

In this discussion an age-old enemy of mankind, and a reliable index of physiological, social, and economic well-being, must not be forgotten. In England and Wales deaths from respiratory tuberculosis increased by 6 per cent in the first year, and by 10 per cent in the second year of the war.[7] In the United States,[8] judging by the experience of the Industrial Department of the Metropolitan Life Insurance Company, the death rate from tuberculosis of the respiratory system has maintained its downward trend among industrial policy holders through the first five months of 1942. Sufficient time has hardly elapsed, however, to expect to find a definite indication of a change in the trend in death rates from a disease of long duration.

The epidemiological implications of population shifts with regard to exotic tropical diseases is more difficult to assay. Their importance to the armed forces in Africa, the West Indies, Central America, and the Far East is real and immediate. The threat to the civilian population of the United States still seems remote, with one possible exception, and that is yellow fever. The spread and volume of air travel under the exigencies of military and naval operations has rendered ineffective such measures of quarantine as were formerly in force. That there are sufficient numbers of *Aëdes aegypti* in certain towns and cities of the southern United States to support an epidemic is indicated by the outbreaks of dengue which have occurred within recent years. The only remaining defense against importation is specific immunization of exposed persons.

SUMMARY

Although the continental United States has not yet been engulfed in devastating warfare, industrial and military mobilization has brought about extensive population movements which are continuing. The shifting has been principally an evacuation from the rural districts to urban reception areas. In many of the cities and towns adjacent to military and industrial establishments conditions have been created which are potentially dangerous from an epidemiological viewpoint. Yet the experience thus far from infectious diseases has not been unusual. The period of elapsed time has been

relatively short. The trend of certain infections which are indices of social welfare should be followed with careful attention. The potential hazards in the immediate future would seem to be principally from viruses and bacteria with which we are already familiar, especially those which are parasites of the human respiratory tract.

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Protection of Water and Food Supplies in an Emergency*

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WAR causes many changes in the normal way of life. Some of the expected changes are population shifts, new production methods, shortages of important materials, substitutions, lower standards of manufacture and inspection, and the appearance of new products and new methods.

An emergency may be created in any one of a number of ways, other than by war—from fire, flood, hurricane, earthquake. For the purpose of this paper the emergency resulting from war or enemy action is used as an example, but many of the matters discussed could originate in any one of a number of ways.

Food is obviously essential for maintenance of civilian health and morale, as well as for military personnel and defense production.

Water is the life blood of any community. Its use for washing, sanitation, drinking, food preparation, and to fight fire, is so completely taken for granted that it is seldom thought of until the supply is interrupted or cut off entirely.

WATER SUPPLIES

The following are a few things that may happen to a water system in an emergency:

The system may be seriously overloaded by increased population and war production. Drought or enemy action may result in depletion of the supply. Lack of material may result in the substitution of inferior materials for construction and repair. The water system may be affected through enemy action by bombing, shelling, sabotage, gas attack, power failure, poisoning, or bacterial pollution. All of these things can be fairly and adequately met by proper precautions.

America has the highest standards of water supply in the world. These standards must be maintained. The water supply should be protected at its source against the possibility of pollution or enemy action. The water treatment plants should be protected. The transmission and distribution systems should be surveyed for defects, and protective measures should be taken.

In protecting a water system against accidents, or against trespass which may result in sabotage, a number of points should be mentioned. Visitors should be excluded from operating properties of the water system. These properties should be fenced and posted with conspicuous signs warning against trespassing. Guarding is frequently overemphasized. Guarding of property by a man is the most expensive form of protection, and results are not always satisfactory. Guards, where used, should not be posted in conspicuous or isolated places without some protection

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to themselves, such as fencing or alarm devices. Guarding should be correlated with a communications system, the guards being required to report in at frequent, regular intervals. Should any guard fail to report on schedule, the reason should be investigated.

Many people are concerned about the possibility of poisoned water supplies. The mechanics involved in poisoning a public water supply are such as to minimize the likelihood of this type of sabotage. Large quantities of poisonous compounds are necessary to poison a water supply effectively. These compounds are frequently expensive and not readily obtainable. Most poisons tend to hydrolize rapidly in water and are not effective unless thoroughly mixed with the water.

Certain simple tests can be readily made by any laboratory or water works man for the detection of unusual conditions indicating pollution or poison in the water supply. A sudden change in pH is an indication of some unusual condition in the water. A sudden decrease in the dissolved oxygen content, or an increase in the oxygen consumed value indicates the presence of an organic substance which may have been added to the water. A sudden increase in chlorine demand or a disappearance of the chlorine residual indicates the presence of an unusual substance. The sudden appearance of a taste, odor, or color in water should be investigated. These tests are simple, easy to make, and are a good indication of any unusual condition in the water supply.

Bacterial pollution of water supply is also a possibility, but again the mechanics involved in obtaining and introducing disease organisms reduce this possibility. A chlorine residual throughout the distribution system provides one safeguard against this type of contamination. Frequent bacteriological examinations of the water supply should be made.

Usual methods of water treatment, consisting of coagulation, filtration, and chlorination provide reasonable safeguards against bacterial and chemical pollution.

Bombing and shelling introduce complicating factors. Bombs may break parallel water and sewer pipes and the bomb crater may fill up with a mixture of water and sewage. The sewage is likely to drain off into the water system. The occurrence of fire, which nearly always accompanies bombing or shelling, results in great increases in water consumption with attendant low pressures.

To meet this emergency situation there is being developed throughout the country a mutual aid plan involving the exchange of materials, supplies, equipment, and personnel. An inventory of these materials is being made and an organized plan of exchange among water systems is being worked out under the direction of water supply coördinators who are part of the Civilian Defense organization.

The mutual aid plan also seeks to provide auxiliary water supplies for use in event of failure of the regular supply connections between water systems of adjacent communities, emergency chlorination and treatment of auxiliary supplies, provision of auxiliary power sources in the event of power failure, and protection of the sources against subversive action. This plan has been thoroughly organized in most localities, and is ready to function in an emergency. Any community not having such an organization should start one.

FOOD SUPPLIES

Any one of the following things may affect the food supply of a community: bombing, shelling, gas attacks, sabotage, lower standards of raw foods, lower standards of food preparation, lack of inspection, and the use of substitute foods.

In an emergency, supplies should still be protected from the source to the ultimate consumer. Lack of personnel already threatens a lowering of inspection standards. It is imperative that inspection be carried on at the usual level.

Unusual circumstances, such as blackouts, increase the problems of preparing and handling foods. Changes in the use of containers and of material in containers have introduced new problems. The use of new types of containers requires careful supervision to insure proper sanitation. The possibility of polluted water supplies used in food manufacture should be watched and guarded against.

STORAGE OF FOODS

With increased complications in transportation, and the possibility that portions of the country may be isolated by enemy operations, there is a likelihood that storage of foods will become necessary in some locations.

In England special buildings have been constructed for the storage of food. The buildings measure approximately 120 x 220 feet and hold 8,000 tons of food. They are built of reinforced concrete, and all openings can be tightly sealed against gas attacks. The construction of such buildings is probably not necessary in this country, but provision should be made for the storage of foods in existing structures. Where possible, food should be stored in or near a hospital or institution where large quantities of food are regularly used. The institution can use up the older stock first, to maintain a regular turnover and reduce the likelihood of spoiling. Regular inspection should be made of all stored foods to see that they are in good condition. Precautions should be taken to protect foods against insects and vermin.

BOMBING AND SHELLING

A bomb burst will shatter glass panes for a considerable distance from the blast itself. Shattered glass, flying in all directions, may readily destroy food. The explosion also raises dust, which settles on exposed food. By way of precaution the quantity of food on display should be reduced to an absolute minimum, especially that displayed under glass. Slivers of glass driven into meat may not be detected until the meat is consumed.

In some cases it may be desirable to protect certain storage plants by sandbagging or protective walls. Due to the shortage of bags and their tendency to deteriorate, sandbags are not favored. A simple protective wall may be formed by constructing wooden forms, as is done for a concrete wall, and filling them with an earth-asphalt mixture.

Refrigeration machinery, which is expensive and difficult to replace, should be protected against damage. The escape of refrigerant gases in case of a bomb hit or near-miss may complicate the situation. Storage plants should be effectively blacked out so that they can operate continuously. Ventilation is difficult during blackouts except by forced draft. Provisions should be made to clear refrigeration gases from plants as quickly as possible after bombings; some gases, particularly ammonia, are toxic in low concentrations.

GAS DAMAGE

Gases used in enemy action are of two types, persistent and non-persistent. The persistent gases such as mustard and lewisite come in an oily form which slowly vaporizes. The non-persistent gases are mostly irritants and smoke; they are readily dispersed by the wind. Following a persistent gas attack any contaminated material should be treated to neutralize the effect of the gas.

PROTECTION OF FOODS AGAINST GAS

The greatest danger to foods comes from the oily vesicant gases.

1. *Protective Measures*

a. Wherever possible vulnerable foods, e.g., those stored in sacks, hessian wrappings, open crates, etc., should be stored elsewhere than on top floors or in basements.

b. Tarpaulins, preferably of the impervious, oil-painted variety, or oilskins are the best kind of cover for storage of foodstuffs in packages. They give good protection against oily splashes of liquids such as mustard gas. Such protection greatly reduces the labor of the decontamination personnel.

c. Wherever practicable the tarpaulin should closely cover the pile of packages, but when this is not convenient it can be arranged as a covering fastened on hooks or frames so as to form a screen or curtain. Where free circulation of air is essential for satisfactory storage, as for fresh fruit in crates, etc., the screens or curtains should be arranged so that they can be pulled into position as soon as a raid warning is given.

d. Canvas or sacking can be used for coverings or screens when tarpaulins or oilskins are not available. They give no protection against gas or vapors, but soak up the oily drops of liquids, thereby reducing contamination. Anything that helps to protect the food containers from being splashed is of value.

e. Food in chambers, such as refrigerator stores, cold rooms, gas chambers, etc., requires no additional protection from gas, providing the doors are reasonably gas-tight and precautions have been taken against contaminated air entering by a ventilation system.

2. *Decontamination*

a. Bulk supplies of food which have become contaminated by poison gas should not be touched except by those fully trained in decontamination methods and adequately equipped with protective clothing, respirators, etc. Rough-and-ready attempts to decontaminate may lead to injury of persons and to loss of food which otherwise might have been salvaged. If trained personnel is not immediately available, a report should be made without delay to a gas officer or to the health department.

3. *General Precautions against Gas*

a. Refrigerators and cold storage lockers give good protection against gas if they are reasonably airtight. Doors and fittings should be examined to see that they are in good condition.

b. The exposure of food in windows or on open shelves, where liability to contamination is greatest, should be reduced to a minimum.

4. *Precautions to Be Taken in the Event of an Air Raid Warning*

a. All windows, doors, shutters, etc., should be closed, and any other precautions taken which time permits, to shut off the food supplies from contact with the outside air.

b. Extractor fans or other artificial ventilating systems that draw outside air into the food store or chamber should be shut off.

5. *Protection of Foodstuffs in the Home*

a. Store as much food as possible in cans with tight-fitting lids or in bottles with good stoppers or screw-caps. Clean, dry biscuit cans serve to hold supplies of flour, rice, pea-flour, and similar non-perishable foods. If they are reserve supplies the cans or bottles can be carefully wrapped before being put in a cupboard or on a shelf.

b. Perishable foods, such as meat, fish, eggs, milk, butter, etc., are quite safe if kept in one of the ordinary types of domestic refrigerator, providing the door forms a reasonably airtight seal. In other cases, protection for perishable foods should be contrived by the intelligent use of cans, bottles, or wrappings of the type mentioned above.

6. *Food and Livestock in Markets*

a. All contaminated food should be held until it has been inspected by the local public health officials, who will decide whether it can be decontaminated or whether it must be destroyed.

TABLE 1

MATERIALS USED FOR COVERING OR HOLDING FOODSTUFFS

Nature of Covering	*Protection against Poison Gas or Vapor*	*Protection against Liquid Poison Gas*
Sealed metal drums	Complete	Complete
Sealed metal-lined cases or casks	Complete	Complete
Sealed cans	Complete	Complete
Cans with well fitting lids but not sealed	Fairly good	Good
Glass bottles, glazed earthenware vessels, with well fitting stoppers or lids of glass, metal, bakelite, or similar impervious materials	Complete	Complete
Bottles or glazed vessels with ordinary cork stoppers	Fairly good	Good
Sealed wooden barrels such as are used for transporting and holding liquids	Complete	Complete, except in cases of heavy and prolonged contamination which may impregnate the wood to a significant depth
Bottles and jars covered by grease-proof paper	Fairly good	Moderate, but additional protection can be provided by an outside covering of a transparent cellulose wrapping *
Waxed cartons	Good if well sealed	Good if all joints are waxed or covered by a layer of a transparent cellulose wrapping
Papier mache cartons	Good if well sealed	Fairly good. A transparent cellulose wrapping gives additional protection
Transparent cellulose wrappings	Good	Good
Metal foil wrappings	Good if no pinholes	Good if no pinholes
Oilskins, tarpaulins	Fairly good	Good
Bags lined with transparent cellulose wrapping	Good	Good
Grease-proof paper	Good	Fairly good if contamination slight
2- or 3-ply bitumen or tar-lined paper	Good	Fairly good if contamination slight
Wooden boxes	Good if all joints tight	Poor. Soft woods are very absorbent
Thick cardboard boxes	Good if all joints tight	Poor, very absorbent
Paper containers	Poor	None
Sacks, canvas, hessian, and other textiles	None	None (except when used as screens)

* Many types of cellulose wrappings are on the market. Those prepared from cellulose, cellulose acetate and nitrocellulose are, in general, good as protective wrappings against gas. Those based on benzyl cellulose are less satisfactory.

PROTECTIVE CONTAINERS

Protection of foods against gas can be adequately accomplished by the use of a proper container. Some containers are quite effective, others are almost entirely ineffective.

Protective Value of Materials Used for Holding or Covering Foodstuffs

The relative protective value of a number of materials commonly employed for packing foodstuffs is shown in a list (see Table 1).

THE EFFECT OF GAS ON FOODS

Gas has a very definite effect on most foods. Some foods can be salvaged following gas attacks, others must be destroyed. The following table is presented giving some foods indicating the effects of phosgene gas. The same effects may be considered with other gases except that the arsenic gases are definitely dangerous. Mustard is more persistent and more difficult to treat than phosgene.

MILK

Milk, an essential food in any community, should be protected against damage. Bombing may destroy milk plants. Substitute plants should be available, or some other means of handling the milk supply should be provided. The milk industry might well consider the possibility of a mutual aid plan for the handling of milk.

Pasteurization is essential to the protection of milk supplies, and provisions should be made for emergency pasteurizing plants. Cheese, ice cream, and butter plants, with some adjustment, may be utilized for this purpose. Vehicles for the delivery of milk and dairy products should be decentralized, so that one bomb cannot disrupt the delivery service.

The possibility of sabotage through

TABLE 2

EFFECT OF PHOSGENE ON SOME FOODS

Food	*Effect*	*Whether Dangerous*	*Treatment*
Flour	Becomes sour and slightly unpalatable. May make a poor loaf	No	48 hours' airing. Can then be blended with 5 parts of undamaged flour and will bake normally
Bread	Outer layers may become unpalatable	No	Cut away outer layers and air remainder
Cereals	Negligible	No	48 hours' airing
Meat and Fish	May become slightly discolored on the surface	No	Condition improved by airing and cooking
Milk	May slightly affect taste	No	Bring to boil
Eggs	None	No	. . .
Cheese, Butter, Margarine, and Fats	May bleach slightly on surface	No	If bleached, cut away affected part, which may be used for cooking. Remainder is edible
Dried Fruits	Slight loss of palatability	No	Air and cook
Fresh Fruits	Almost none	No	Air and peel off skin or outer layer
Fresh Vegetables	Green vegetables may be slightly bleached	No	Air and cook
Tea, Coffee	May become bitter and unpalatable	No	None is effective, but such material might be used for blending

the milk supply should not be overlooked. Milk is subject to pollution from its source to the consumer. Pasteurization protects against all forms of vegetative bacteria, the group that includes most of the disease producing organisms. Adulteration and contamination of the milk supply following pasteurization should be guarded against.

Milk truck drivers, employees of milk plants, and even delivery men, should be thoroughly investigated as to loyalty. Riders or hitch-hikers should not be permitted on milk trucks. Covers on milk tanks and trucks should be sealed and rigidly inspected. Milk absorbs some gases, and an exposed milk supply will probably have to be destroyed after a gas attack. Bottles or paper containers for milk are effective protection as long as they are tightly sealed.

The use of paper containers for fresh milk has the advantage of conserving space and weight. Twelve quarts of milk in glass bottles weigh approximately 60 pounds. The same milk in paper containers weighs only 25 pounds and occupies about half of the space required for glass containers. This is an important factor in the rubber tire shortage and the consequent food delivery problem.

The War Production Board has restricted the use of tin to about 50 per cent of its normal consumption. The canning industry will reduce the probable consumption of tin by about 50 per cent. There were on hand in this country, at the end of 1941, about 140,000 tons of tin. Our importations from South America are normally about 18,000 tons a year, plus 11,000 tons from Africa, and it is expected that the tin salvage campaign will result in the production of about 6,000 tons a year. The normal consumption of tin is about 70,000 tons a year (although we consumed more than 110,000 tons in 1941), but by economical use and new methods this may be reduced to 50,000 tons or less a year. The electroplating process, to take the place of the dipping process eventually will reduce tin consumption in the tin plate industry to about one-third of the former rate. Electroplated cans are good for approximately two years with most products, except in extremely warm climates. Any product with a pH above 5.0 needs no tin.

The use of glass containers is being expanded as far as possible, but they are not suitable in all cases because of the expense involved, the use of critical materials, and the shortage of rubber for jar rings, though plastic rings are coming into use to a certain extent. The dehydration of foods is being largely expanded. The principal drawback is the product's lack of appeal. An educational campaign is needed before consumers will be willing to buy products differing so much in appearance from the fresh or canned foods to which they are accustomed.

The use of containers for military purposes is greatly increasing. Practically all foods shipped to the armed forces must be protected with metallic containers because of rough handling, extremes of temperature, vermin and weevils. Sugar and flour, normally placed in bags, have to be encased in metal containers for use in the tropics.

The use of large containers for products which have to be sterilized in the container is extremely difficult because of the length of time required for proper heating. It is possible to bring a normal can to a uniform temperature of 240° F. in a few minutes. The same product in a large container holding as much as 10 gallons would require 16 hours of heating.

The milk industry uses an enormous number of cans for the condensed and evaporated product. There is an increasing tendency toward the substitution of dried milk, which may be packed in metallic or non-metallic containers.

There may be consumer resistance to dehydrated milk as to other dried foods. The protective problem is the same as for other packaged foods.

CONCLUSION

Public health people are facing many problems resulting from the war. The war is only one of the emergencies with which we may be faced, but it is probably the most extensive, affects the most people, and is the most prolonged of any emergency we can anticipate.

The shortage of certain materials and of personnel has resulted in extensive substitution of foods, containers, and processing methods. Inspection is difficult because of limited personnel.

The water and food industries are facing unprecedented emergencies, and public health people should be prepared to meet these emergencies when they arise.

Let's not be caught with our water plants down, and let's keep 'em eating.

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The Massachusetts Vision Test

An Improved Method for School Vision Testing *

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THE new vision test recently introduced into the schools of Massachusetts represents an effort to bring screening procedures used in schools more nearly up-to-date and in line with practices approved by leading eye specialists. It was constructed through the coöperative effort of eye specialists and educators working in the schools.

According to descriptions of vision testing programs received from 43 other states,‡ Massachusetts ranks high among the states recommending comprehensive vision service in the schools. A summary of conditions here, therefore, may not be far amiss in pointing out inadequacies existing generally throughout the country.

The law of Massachusetts covering the vision testing reads as follows:

CHAP. 71, SEC. 57. Testing for Defects—Physical Record. The committee shall cause every child in the public schools to be separately and carefully tested and examined at least once in every school year to ascertain defects in sight or hearing, and other physical defects tending to prevent his receiving the full benefit of his school work, or requiring a modification of the same in order to prevent injury to the child or to secure the best educational results, and shall require a physical record of each child to be kept in such form as the department may prescribe. The tests of sight and hearing shall be made by the teachers, directions for which shall be prescribed by the Department of Public Health.

CHAP. 71, SEC. 58 (As amended by Chap. 287, Acts of 1935). Furnishing of Test Cards, Blanks, etc. The department (of education), after consultation with the department of public health, shall prescribe and furnish to school committees suitable rules of instruction, test cards, blanks, record books, and other useful appliances for accomplishing the purposes of sections fifty-three to fifty-seven, inclusive, and may furnish said material to such boards of health, as may require it in the performance of their duties. The department may annually expend therefor a sum not exceeding twelve hundred dollars, and shall provide for pupils in the teachers' colleges instruction and practice in the best methods of testing the sight and hearing of children.

The Department of Education, accordingly, has supplied each teacher with a test card and instructions for giving the Snellen test for visual acuity. The record for each child is transferred to his general health record during the first month of each school term and then filed with the superintendent or the school nurse. It becomes the duty of the latter to retest all children who fail the test as given by the classroom teacher. Such failure, if corroborated by the nurse's retest, results in notification to the parents and the suggestion that the child be taken to the family eye specialist. The plan was well con-

* The material of this paper is based upon a study conducted by a staff composed of the following members of the Massachusetts Department of Public Health: M. Luise Diez, M.D.,† Division of Child Hygiene; Albert E. Sloane, M.D., Consultant Ophthalmologist; Lura Oak, Ph.D.; John W. M. Rothney, Ed.D.; Miriam Forster, M.A., and Philip W. Johnston, Ph.D. The work was made possible by a federal grant to the Division of Child Hygiene.

† Deceased.

‡ Received in reply to a questionnaire sent out to all state departments of health. Eleven questions were submitted which were designed to cover contemporary school vision screening practices.

ceived and, on the surface, may appear to take care of the matter. Actually, the practical working out of these provisions has fallen far short of meeting the needs of the children.

The breakdown in the Massachusetts plan appears at four points: (1) failure of those giving the test to conduct it properly; (2) lack of resources for providing follow-up examinations and treatment, especially in underprivileged communities; (3) the inadequacy of the Snellen test, alone, as a test of visual function; (4) the fact that direct or indirect financial interests of some eye specialists interfere with honest professional service to the children.

During the course of our 3 year study of school vision testing it was possible to observe at first-hand the operation of the program in this state, and also to carry out certain minor investigations subsidiary to the main survey* being made. Those directing the study within the schools included an ophthalmologist and two educational psychologists.

By visiting classrooms while the regular vision test was being conducted, it could be observed that memorizing of the chart by the children was a common practice which some teachers failed to observe. Children were seen to take the test as though reciting a section of the alphabet and probably without any idea that they were cheating the record. Among the younger children the idea uppermost appeared to be to simulate the illiterate symbol (E) with hand movements. They were intrigued with hand-turning rather than with revealing what they could see on the chart at 20 feet. Often these youngest children were observed to practise near the chart. Upon the subsequent test by the teacher they were merely recording a practised hand exercise which might be executed without the necessity of seeing all of the symbols. A 15 year old boy who had become sightless in one eye, yet had had a passing record for that eye on his health card each year, proved to us that he could still say the test "by heart" as he had learned it at 6.

The responsibility for such mistakes rests with the individual teacher or nurse giving the test, though it should be noted that the small chart in use here for several years, with a maximum of six test units for each rating, would probably become familiar to any intelligent child after a few repetitions. Skipping and reversing the sequence, however, probably lowers the chances of memorizing. Obscuring the card from all except the one being tested also reduces the chances of error in the record. These precautions were observed by some of the teachers.

Another unfavorable feature noted in many classrooms was unsatisfactory lighting. A 20 foot distance was usually marked off with a view to space and convenience and all testing was subsequently done at this spot. Lighting, glare, or shadows received only secondary attention, regardless of how these varied with weather and time of day.

In studying the validity of the tests as they are generally given, a random selection of 368 Snellen test records made by 50 teachers was compared to the Snellen test records for the same children (ages 8–13) made by our staff ophthalmologist.† The two sets of records for visual acuity were found to correspond in 237 cases (64 per cent) and to disagree in 131 cases (36 per cent). In this and other comparisons made during the course of the study the discrepancy between such records indicated that the tendency of error was

* This was an investigation into the causes of early school failure through a study of handicapped children in selected areas of the state.

† The comparison of such records in so far as they indicate that the teachers' findings are inferior is based upon an assumption of perfection in the experts' record, a result which may be only approximate for any given examiner.

toward a lower rating (indicating lowered vision) in about two-thirds of the cases and toward a higher rating in one-third of the cases in which a disparity between records occurred. The practical interpretation of these findings suggests that, while some children are sent needlessly to the family eye specialist, a number with lowered visual acuity are being overlooked.

By means of a similar comparison between the Snellen records of a single teacher with special aptitude and skill in giving the tests and records of the staff ophthalmologist for the same children, the importance of individual differences among teachers is suggested. For example, in the case of one of the more capable teachers who had given the Snellen tests to all children (294) throughout a school, there was agreement with the specialist's findings in 230 cases (78 per cent) and disagreement in 64 (22 per cent).

Conclusions to be drawn from our observation of school testing by the teachers and a study of records may be summarized as follows:

1. The Snellen test as used by teachers at present is but a coarse screen for sorting out some of the children who need an eye specialist's attention.
2. The validity of the test may be increased through the selection and training of qualified persons.
3. The reliability of records could be increased by improvements in materials and methods with a view to minimizing opportunities for memorization.
4. Calibrated standard illumination upon the charts should also result in more accurate records.

The school nurse in Massachusetts holds an important place in the vision testing program. Frequently, the superintendent gives her complete responsibility for supervising the initial testing by the teachers, for giving retests to those who fail, and for checking the notices to parents in cases where the attention of the family specialist is indicated. Many superintendents and some nurses have expressed the belief that vision testing is the province of the health division, including the school nurse. Where such conclusions had been made it was usually observed that the personality of the nurse, her effectiveness in parental contacts, and the limits of her pupil load were so combined that she could undertake the vision work without jeopardizing other duties. The practice most commonly observed throughout the state was the routine testing of all children by each teacher and the retesting by the school nurse of all who had failed.

Among school nurses, as among teachers, a wide range of individual differences appears in the administration of duties in the vision program. The extremes show, on the one hand, instances where only casual effort is made and, on the other hand, the work of the highly efficient nurse who sees to it that each referred child is carefully retested and, when the records indicate, receives the needed ocular attention.

Our close contact in the schools during the 3 year period led us to note certain shortcomings in service rendered by some school nurses. The following summary presents a composite of factors which need correction here and there, rather than a fair commentary upon practices in general.

1. Nurses do not always distinguish between the results of a screening test and a professional diagnosis. Parents, therefore, have been confused and often needlessly annoyed. Notices to parents regarding failure on a vision test should be free of suggestion that the child needs glasses. Diagnosis should always be left to the specialist. The implication of the notice to parents, whether written or verbal, should be: In our school vision test your child did not make a perfect score. In order to make sure that his vision is normal or that any deficiency may be corrected, will

you please have his eyes checked by your family specialist.

2. Nurses, themselves, are frequently uninformed regarding the nature of a specialist's service. The wearing of glasses does not necessarily mean that the child's problem is finally solved. In many cases a child wearing glasses should return frequently to the specialist to be rechecked. The appearance of symptoms in a child, even if his glasses are new, should be an indication to refer him again to the specialist unless it is known that the latter is aware of the symptoms and disregards them in that case.

3. While nurses may not recommend specialists to the parents, they may suggest that the family physician be consulted for the name of a qualified eye specialist. Lacking such guidance, numbers of parents take their children to department store counters where glasses are bought as hair ribbons or tooth brushes are bought. Others are supplied from discards found around home. Frequently the spectacle merchant with the biggest sign or window display attracts the majority of those who are seeking professional services without understanding or guidance.

4. Nurses should inform themselves regarding the professional services available to their communities and assist in efforts to encourage high standards. The earmarks of good service for children are to be found, not in the kind of letters at the end of the specialist's name, nor in office equipment, window or sign displays. They can be judged to some extent by a knowledge of the length and thoroughness of his special professional training, the sincerity and honesty of the specialist as known to those who have availed themselves of his service, and also the particular interest and skill revealed by him in understanding and handling children. Nowhere is the personal equation of greater significance. The younger the child, the greater is the importance of a patient, sympathetic manner on the part of the examiner.

Until such a time and means can be found for a complete ocular examination by a qualified specialist for each child, the measures to be taken by the school will fall short of satisfactory solution. Non-specialists, such as nurses and teachers, should not be expected to make a diagnosis. No instrument or set of tests based upon the child's subjective reactions should be counted upon to yield perfect results. At best, the school test should detect all who need ocular attention, including the "borderline" cases.

In this connection, it should be mentioned that wide differences exist in the practices of individual specialists and that variance in standards for prescribing glasses reflects upon the efficiency of the school test in any given community. For example, if the school test should be designed to sort out children with a refractive error of, say, one and a half diopters of hypermetropia (farsightedness) and such children are referred to a specialist opposed to fitting children of young age for this degree of simple hypermetropia, the school test may come into disrepute among the specialists and the parents of children so referred. If, on the other hand, the same test is used in a community where the specialists are inclined to prescribe glasses to certain children for this degree of refractive error, the test is credited with higher accuracy. Some specialists prescribe treatment for all so-called borderline cases, while others decline to fit any of them. The relative accuracy and the popularity of a school vision test are found to rest to a considerable extent upon the professional philosophy of local specialists.

The watchword for those seeking to improve the school's effectiveness in keeping check on children's eyesight may well be phrased in the familiar

words of Sidney Webb: the *inevitability of gradualness*. Education of the public, insistence upon standards of service, and conscientiousness in the use of improved materials to the end that greater improvements will result—these are the objectives of public health minded individuals everywhere.

The new Massachusetts Vision Test* now available for general use is designed to meet the need for improved procedures which will bridge the gap between present inadequate provisions and the time somewhere in the future when the eyes of all children will be examined by a qualified eye specialist. It was developed after a 2 year study in which over 6,000 children were tested and checked against an ophthalmologist's examination.

The administration of the test requires an average time of 2½ minutes for children 8 years of age or older. Slightly longer time is allowed for those who are younger. The same test (with only a change in one item) can be used for all children from 5 to 18 years of age. Anyone accustomed to working with children can successfully administer the test by reading the instructions and practising the routine four or five times.

The test kit can be purchased in carriers if the portable feature is desired. It consists of the standard Luckiesh Moss Illuminator*; the improved form of the Snellen Test card; a house chart mounted on a frame with an electrical unit and light source; a near phoria tester, also with an electrical unit and light source; spectacles with plus sphere lenses, others with Maddox rods; and a central switch for controlling the lights.

In addition to the usual test for visual acuity, the series also provides tests for latent hypermetropia and for muscle imbalance.

After 2 years of use in many school systems throughout the state, the consensus of opinion among eye specialists and school departments is generally very favorable toward the test as a whole. The additional features are usually recognized as significant improvements. In a few situations, however, where the local eye specialists are skeptical about testing for any condition except visual acuity, there is considerable lag between the numbers screened (roughly 35 per cent) and those receiving correction (20 per cent).

If the form of the new test results in lively controversy over the innovations this is to be welcomed, since the result is heightened interest in problems of school vision testing and a broader education for all who are concerned in its solution.

* Distributed by Welch-Allyn Company, Auburn, N. Y.

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Field Equipment for Food Inspectors

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THE scope of activities of the food inspection staff of the Baltimore City Health Department has been greatly extended during recent years. This was done largely by providing the inspectors with improved testing outfits. The new outfits make it possible to sample materials more efficiently and permit a variety of chemical testing during the course of inspection. In this way a considerable reduction is effected in the number of samples which otherwise would have been submitted to the Bureau of Laboratories of the department. Moreover, the removal of hazardous chemicals and spoiled food from food establishments is greatly expedited. It is the purpose of this paper to describe the methods and equipment used by food inspectors of the Baltimore City Health Department for making some analytical examinations in the field.

FIELD EQUIPMENT

Each inspector has a convenient leather case (Figures 1 and 2) which contains the usual detention cards, violation notices, copies of laws, educational forms and leaflets, sample identification cards, and such conventional equipment as flashlight, thermometer, can opener and meat trier. Paper bags and paper spoons are carried for collecting food samples; sterile 4 oz. bottles for water samples, and sampling vials for food utensil swabbing. Portable apparatus is also provided for the detection of fluorides, cyanides, cadmium, arsenic, and sulfites; equipment is included for testing the strength of chlorine solutions used as disinfectants and for the detection of spoilage of shucked oysters and crab meat. Wherever possible, testing materials are contained in uniform glass vials and each case is fitted with a wooden rack to hold the apparatus. All solutions, test papers, and other equipment are periodically replaced and reconditioned by the Bureau of Laboratories.

ANALYTICAL PROCEDURES

1. *The Detection of Spoilage of Shucked Oysters*—

The usefulness of pH measurements of oyster liquor as an adjunct to organoleptic examination in the detection of spoilage of shucked oysters has been demonstrated by several investigators.[1, 2] The pH of fresh shucked oysters varies between 6.0 and 7.0. A pH value of 5.4 to 5.8 is regarded with suspicion, while values below this range are indicative of decomposition. A convenient field examination is made by transferring 5 ml. of oyster liquor to a test tube graduated at 5 ml. and adding 0.5 ml. of methyl red indicator solution (0.02 per cent methyl red in 50 per cent alcohol). After mixing, the color produced is compared with the methyl red color standards in sealed glass ampules. Standards reading pH 5.4 and 6.0 are provided. If there are indications that

FIGURE 1—Leather case containing equipment

the oysters have been recently washed, several drops of the indicator solution are placed directly on the oyster. The production of a persistent red color indicates spoilage.

2. *The Detection of Spoilage of Crab Meat*—

The decomposition of crab meat involves a progressive proteolysis, accompanied by a rapid rise in the ammonia

FIGURE 2

content of the meat. In 1932 Harris[3] proposed the Nessler ammonia test as a means of differentiating fresh from spoiled crab meat. The test used by our inspectors is done in this manner: About 1 gm. of crab meat is transferred to a test tube and shaken with several ml. of water, and 2 to 3 drops of Nessler's reagent are then added. The immediate development of a deep yellow or brown color indicates spoilage of the meat. The test is used only as an aid to organoleptic examination of the suspected crab meat.

3. *The Detection of Cyanide in Metal Polish*—

In 1930, Williams[4] pointed out the possible rôle of metal polish which contained cyanide in cases of gastroenteritis. In 1938 the Maryland State Department of Health adopted regulations governing the retail sale or use of cyanide containing preparations. Many other communities have similar legislation.[4]

The qualitative detection of cyanide in metal polishes in the field may be conveniently made with sodium picrate test papers.[5] This test paper is moistened with water and is then suspended in the container of the suspected polish. Care is taken that the paper does not come in contact with the material. The paper turns orange and then brick red in 5 to 10 minutes if the concentration of cyanide (as KCN) exceeds 0.5 per cent. Although the reaction is not wholly specific for cyanide, the method serves as a ready screening test in the field.

4. *Cadmium*—

Because of the difficulty in obtaining aluminum and stainless steel there has been a tendency on the part of the equipment manufacturing companies to use cadmium for plating utensils and equipment. A number of food poisoning outbreaks attributed to the consumption of acid foods stored in cadmium-plated vessels have been reported.[6] Warnings of the dangers of the use of cadmium-lined utensils have been issued to the newspapers by the Federal Security Agency.

A simple testing unit to detect cadmium during the inspection of food establishments in Baltimore was devised.[7] The outfit consists of two small vials. One contains strips of filter paper which have been impregnated with a 20 per cent sodium sulfide solution and dried; the other contains small cotton swabs immersed in 10 per cent nitric acid. The swab is rubbed on the suspected metal and is then applied to the sodium sulfide paper which has been previously moistened with water. The instantaneous appearance of a canary yellow stain on the paper indicates the presence of cadmium.

5. *Available Chlorine in Disinfectant Solutions*—

Regulations of the Maryland State Board of Health require that all food containers (drinking glasses, plates, forks, etc.) used in establishments dispensing food or drink, after cleaning and rinsing, must be disinfected either by immersing in water at 180° F. or above, or by immersion in a solution containing not less than 100 p.p.m. of available chlorine.

The strength of chlorine rinse waters is determined by a modification of the orthotolidine test.[8] Inspectors carry a 2 oz. dropping bottle of orthotolidine solution, a 100 p.p.m. permanent chlorine standard in a sealed ampule, a test tube of the same diameter as the standard and graduated at 10 ml., and a medicine dropper calibrated to deliver 20 drops of water per ml. Ten ml. of tap water are added to the tube, followed by 4 drops (0.2 ml.) of the rinse water under test, and 1 ml. of the orthotolidine solution. After 5 to 10 minutes, comparison is made with the standard.

The permanent standard actually corresponds to 2 p.p.m. of chlorine. However, the sample is diluted 1 to 50 in the test. The permanent standards are prepared by the method of Scott, which permits color matching irrespective of the tube length.[9]

Recently a compact portable iodimetric testing outfit for residual chlorine was prepared for dairy inspectors. This outfit consists of Barnes dropping vials which contain potassium iodide-starch solution, lactic acid solution, and standard sodium thiosulfate solution. The rinse water is transferred to a vial graduated at 10 ml. The standard solution is so adjusted that one drop is equivalent to 20 p.p.m. of available chlorine when 10 ml. of rinse water is titrated. This iodimetric method gives a more exact evaluation of the strength of the chlorine rinse water than does the orthotolidine test and it may be used with chloramine preparations, whereas the orthotolidine test does not function well in the presence of chloramine compounds.

6. *Fluoride-containing Insecticide Powders*—

Accidental poisoning from white sodium fluoride is not uncommon. In 1941 the Maryland State Board of Health adopted regulations requiring that insecticides containing sodium fluoride shall be colored Nile blue as a warning. These regulations were adopted because of the widespread use of insecticides containing uncolored sodium fluoride in hotel, restaurant, and hospital kitchens in Maryland.[10]

Inspectors are equipped with vials of fluoride test paper. The test depends on the fact that, in the presence of strong acids, soluble fluorides decolorize the zirconium lake of sodium alizarin sulfonate. Strips of filter paper are impregnated with the fluoride reagent[11] and are then dried. The test is made by moistening a test paper with dilute hydrochloric acid (the orthotolidine solution carried by the inspectors for the residual chlorine test may be used). The moist strip is then touched to the suspected powder and, in the presence of a large amount of soluble fluoride, decolorization of the paper will occur in about 5 seconds. Decolorization is evident in about 30 seconds when a 1 to 1,000 dilution of sodium fluoride powder in flour is used. A reaction time of 5 minutes should be allowed for traces of fluoride. Phosphates and oxalates may yield false tests and therefore positive findings should be confirmed in the laboratory.

7. *Detection of Sulfites in Meat Products*—

Sulfites in ground meat serve partly as a preservative but are employed chiefly to deodorize and to restore the bright red color of fresh meat.[12] The A.O.A.C. qualitative test for sulfurous acid[13] was adapted as a field test. The method for sulfite detection depends upon the evolution of hydrogen sulfide when material containing sulfite is treated with zinc and dilute mineral acid. The evolved hydrogen sulfide blackens a cotton dental roll moistened with lead acetate and contained in a Gutzeit scrubber tube.[14] The essential features of the test are indicated in Figure 3.

To make the test about 10 gm. of ground meat are transferred to a wide mouth bottle containing 30 ml. of 10 per cent sulfuric acid. The bottle is stoppered and shaken moderately for 10 seconds. Several minutes are allowed for foam to subside. Three grams of 30 mesh granulated zinc (arsenic and sulfur free) are added. A stopper containing a Gutzeit scrubber tube[14] previously fitted with a No. 2 cotton dental roll impregnated with 20 per cent lead acetate solution is immediately inserted. The cotton roll will become black in 5 to 10 minutes and after about 10 min-

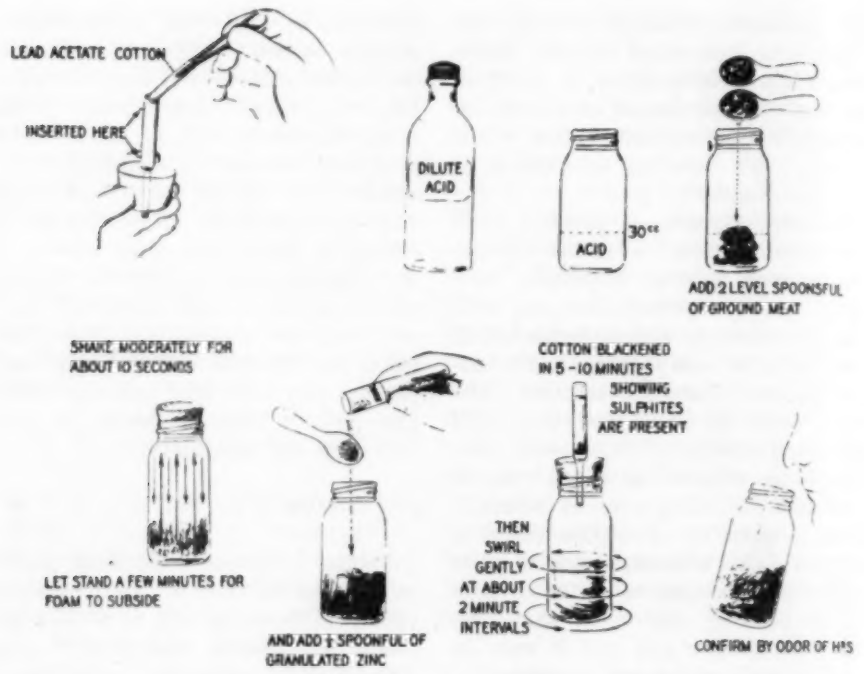
LEAD ACETATE COTTON
INSERTED HERE
DILUTE ACID
30cc
ACID
ADD 2 LEVEL SPOONSFUL OF GROUND MEAT
SHAKE MODERATELY FOR ABOUT 10 SECONDS
LET STAND A FEW MINUTES FOR FOAM TO SUBSIDE
AND ADD ½ SPOONFUL OF GRANULATED ZINC
COTTON BLACKENED IN 5 - 10 MINUTES SHOWING SULPHITES ARE PRESENT
THEN SWIRL GENTLY AT ABOUT 2 MINUTE INTERVALS
CONFIRM BY ODOR OF H2S

FIGURE 3

utes the bottle may be opened, when there will be a decided odor of hydrogen sulfide if sulfites are present. The test will detect as little as one grain of sodium sulfite in a pound of ground meat. Traces of sulfides in foods may yield false positive tests, and because of this the outfits are intended for screening tests only. All samples which show positive reactions are submitted to the laboratory for confirmatory analyses.

8. *Arsenic Spray Residue*—

The presence of excessive amounts of arsenic spray residue on fruits and vegetables is suspected when there are unusual deposits on the foods. In order to eliminate the detention of truck, boat, or railroad shipments pending laboratory examination, testing for arsenic is done in the field. The test used is an adaptation of the official Gutzeit method for arsenic of the A.O.A.C.[14] Similar modifications have been used by others.[15]

The equipment designed for the sulfite determination in ground meat is also used for the arsenic tests. A piece of glass tubing is fitted to the Gutzeit scrubber tube to hold a strip of sensitized mercuric bromide paper. In addition, 15 ml. of 40 per cent stannous chloride solution is added to each liter of the 10 per cent sulfuric acid reagent. In practice the acid used for the sulfite test contains the stannous chloride addition and is thus also suitable for the arsenic examination. The details of the tests are indicated in Figure 4. The directions are essentially the same as in the case of the sulfite examination. Scrapings of suspected material are introduced into the generator. The acid and zinc are added and the reaction is allowed to proceed for 30 minutes. A decided yellow to dark brown colora-

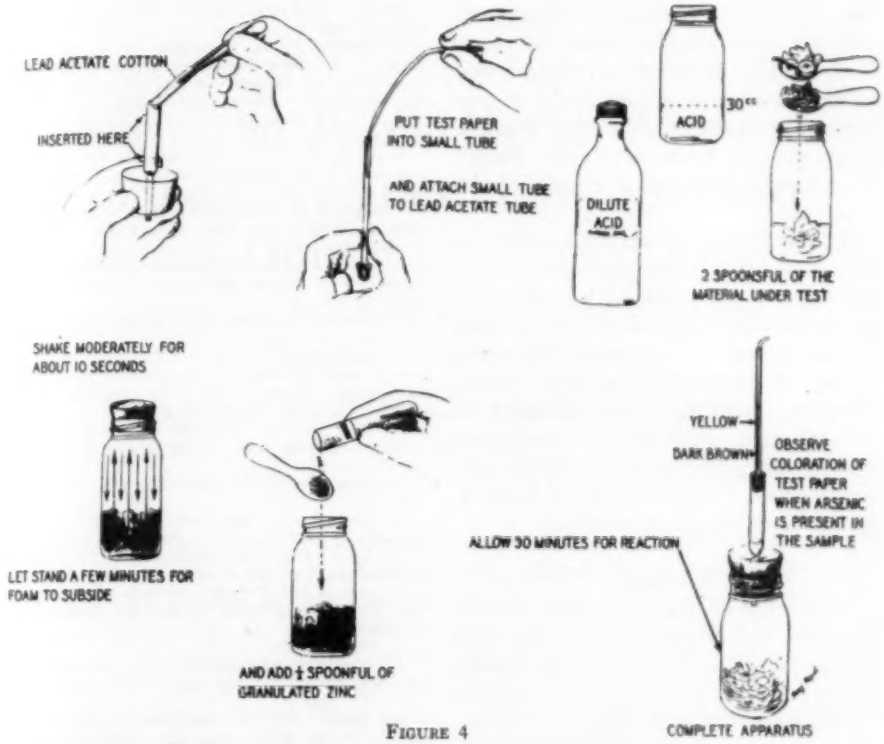
LEAD ACETATE COTTON
INSERTED HERE
PUT TEST PAPER INTO SMALL TUBE
AND ATTACH SMALL TUBE TO LEAD ACETATE TUBE
DILUTE ACID
30cc
ACID
2 SPOONSFUL OF THE MATERIAL UNDER TEST
SHAKE MODERATELY FOR ABOUT 10 SECONDS
LET STAND A FEW MINUTES FOR FOAM TO SUBSIDE
AND ADD ½ SPOONFUL OF GRANULATED ZINC
YELLOW
DARK BROWN
OBSERVE COLORATION OF TEST PAPER WHEN ARSENIC IS PRESENT IN THE SAMPLE
ALLOW 30 MINUTES FOR REACTION
COMPLETE APPARATUS

FIGURE 4

tion of the sensitized mercuric bromide paper indicates the presence of arsenic.

9. *Food Utensil Swabbing*—

The improved vials recently described by Buck[16] are routinely used by the Baltimore City Health Department food inspectors to secure bacteriologic samples from drinking glasses and food utensils. The vials have a plastic screw type closure which holds a wooden applicator with cotton attached. Salt solution or broth is sterilized directly in the vials. It is possible for the inspector to carry a number of these small vials in his carrying case without fear of contaminating them.

10. *Other Tests*—

Other equipment may be added to the inspector's carrying case as needs arise, as for example, the Scharer modification of the phosphatase test for the detection of proper pasteurization of milk and cream[17] which is adapted to field use. Soft drink bottling plant inspectors may use an outfit for testing the alkalinity of wash waters. The foam test[18] for renovated butter and oleomargarine may be carried out in the field by means of a spoon and an alcohol lamp.

DISCUSSION

More than 6,000 field tests have been made by the staff of the Bureau of Food Control of the Baltimore City Health Department during the past two years. The majority of these tests were examinations of chlorine rinse waters and food utensil swabbings. Other tests revealed that metal polish containing cyanide was in use in more than 200 food establishments, which led to regulations prohibiting its use. Field testing resulted in the condemnation of at least

50 lots of incipiently decomposed shucked oysters which could not have been readily detected by organoleptic means. Sulfite in ground meat is now rarely encountered, largely because meat dealers know that the Health Department has ready means of its detection.

The field test is never used as a basis for prosecution. The purpose and the intention of the field tests is to assist the inspectors' organoleptic senses and is not meant to supplant the more critical examination of foods by trained chemists. Inspectors are cautioned to use the field methods for information and screening purposes only and to submit samples to the Bureau of Laboratories for confirmatory analyses.

SUMMARY

A description has been given of the methods and equipment used by food inspectors of the Baltimore City Health Department for making selected analytical examinations in the course of inspections of food establishments.

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Trends in Public Health Activities among Negroes in 96 Southern Counties During the Period 1930-1939

II. Comparison of Certain Health Services Available for Negroes and White Persons

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THE Julius Rosenwald Fund in the summer of 1940 made available a grant to the College of Medicine of Howard University for a 3 months' study of the trend in public health activities in relation to the Negro in the United States, which had taken place during the decade 1930–1939. In formulating the protocol for this investigation, an inquiry into the health situation among Negroes in the rural South was given a prominent place, since the Negro health problem, if there be such, is to be found primarily in the rural South. Therefore, letters and questionnaires were sent to 385 southern counties having full-time health units. The schedules requested information along these lines: first, Negro professional personnel employed; second, availability of certain health services according to race; and third, the personal reactions of the administrators of these health units to certain questions of opinion.

The analysis of the first of these three areas of investigations has already been published.[1] The present article is concerned with the second phase; namely, the trends in the availability of certain health services for Negroes as compared with whites during the decade 1930–1939. The last of these analyses will be the subject of a subsequent paper. For a fuller discussion of the characteristics of the 96 counties studied, the reader is referred to the first article, since only one or two pertinent items which will serve to orient him will be mentioned here.

One hundred and seventeen, or 30.4 per cent, of 385 counties responded. However, of this number, 21 had to be discarded for failure to answer the questionnaire. Thus 96 counties, or 24.9 per cent, provided us with schedules which in part or as a whole could be used in this report. The distribution of these counties according to state is shown in Table 1. It is noted that Alabama had the largest representation of counties, with 24, followed by Florida, Louisiana, and Tennessee, with 10 each. Texas, Arkansas, and West Virginia are the only states not represented. Three counties responded from Texas but were not included because of the inadequacy of the information recorded. No questionnaires were received from Arkansas, while West Virginia was not circularized because of the small Negro population, which comprises only 8 per cent of the total in the state.

TABLE 1

Distribution of 96 Counties According to States

State	No. of Counties Responding
Alabama	24
Florida	7
Georgia	10
Kentucky	6
Louisiana	10
Maryland	6
Mississippi	5
North Carolina	7
Oklahoma	1
South Carolina	6
Virginia	4
Tennessee	10
Total	96

The 96 counties had a total of 3,765,183 population, of whom 1,371,572, or 36 per cent, were Negroes. This represents about one-tenth of the whole Negro population and one-seventh of that of the South. Hence, this sample is large enough to be somewhat representative of this section of the South. The population was largely rural, since only 16 of the 96 counties reported city-county organizations. The largest of these combined units was Jefferson County, Ala., which includes Birmingham within its boundary and gives this county a total population of 475,000 individuals, of whom 184,795 are Negroes.

COMPARISON OF CERTAIN HEALTH SERVICES AVAILABLE FOR NEGROES AND WHITE PERSONS

Unfortunately it was impossible to obtain enough information on all of the health activities investigated from a sufficiently large number of counties to be representative at all times of this group. This is due to the fact that for the most part these health units do not tabulate much of their essential data according to color. This is to be regretted because this is one of the methods which help the health officer or any investigator to determine whether or not services are being made available or used according to the needs of particular groups in the population. Even though the limitation of the data must be kept in mind, yet certain trends may be observed. Furthermore, the paucity of material in certain spheres is an excellent argument for urging better collection and tabulation of the data which are daily gathered by health departments.

1. Tuberculosis — Tuberculosis at present is the seventh or eighth cause of death among whites, while it is first or second among Negroes. Therefore services should be developed in a larger measure for Negroes. This, however, does not seem to be the case.

Clinic facilities are an essential part in the tuberculosis case finding program and constitute a bulwark in the first line of defense against the disease. What has been the progress in this direction during the period 1930–1939? Table 2 provides the data for such a discussion. This table is arranged so that it presents in the first two horizontal tabulations a comparison of 17 counties which reported information for

TABLE 2

Availability of Tuberculosis Clinic Hours for Negroes and for White Persons

Year	Counties Reporting	No. of Deaths		Clinic Hours per Week		Clinic Hours per Week per 100 Deaths	
		N	W	N	W	N	W
1930	17	383	217	4.5	11.4	1.2	5.3
1939	17	228	138	15.3	23.9	6.7	17.3
1939	36	390	240	40.3	48.7	10.3	20.3

both 1930 and 1939; while the last horizontal division considers all of the counties which recorded information for 1939, irrespective of whether or not they provided such data for 1930.

It is readily noted when the 17 counties are compared for 1930 and 1939 that in both periods the availability of clinic services for white persons was much greater than for Negroes, although the number of deaths was greater in the latter group. In 1930, Negroes scarcely received 1 clinic hour per week per 100 deaths, while the white population had almost 5. In 1939, the services increased for both groups, although much more for the Negro, so that the disproportion was cut in half, making this 2.5 to 1. Even though there was a growth in this sphere, yet there were a number of counties which still provided no clinic services. In 1930, of the 17 counties, 10 were deficient in this regard, while in 1939, 8, or 50 per cent, still reported this lack. When all of the counties with data for 1939 are considered, the picture changes very little. It is still found that 18, or half of the counties, had no clinic services either for Negro or white individuals. Although this is a relatively small sample, the fact stands out that Negroes are at present receiving less clinic service and there are still many counties without any services whatsoever.

The outlook is not much better when hospital facilities are evaluated. Here again, the condition in 28 counties which reported for both 1930 and 1939 may be studied in Table 3. As would be expected, the number of beds for white persons was greater than for Negroes in both 1930 and 1939. In the former year the 28 counties reported 0.08 beds per death for Negroes as compared to 0.18 for white persons while, in 1939, this had increased for both races, but the disproportion of two to one was still in the Negro's disfavor. Furthermore, neither for the white nor the Negro population was the minimum standard of one bed per death reached. It is also of interest to note that of the 28 counties, 25 in 1930 had beds neither for white persons nor Negroes, while in 1939, the picture had changed very little, so that 20 still reported no hospital facilities. When all of the counties which reported for 1939 are considered, the picture is somewhat more favorable, particularly for white persons, where the minimum of 1 bed per death appears to have been achieved; but for the Negro the situation is still of concern, since less than one-half a bed is available. It is to be noted also that, of the 61 counties, approximately 40, or two-thirds, reported no hospital facilities for either race.

It is beyond contradiction on the one hand to say that progress in tuberculosis control has taken place in the rural areas during the period of 1930–1939 and, measured statistically, this has been a two- to threefold advance. On the other side, however, it must be admitted that, in spite of too meager facilities and services, the tuberculosis deaths in many of these areas have con-

TABLE 3

Availability of Beds for Tuberculosis Care

Year	Counties Reporting	No. of Deaths		No. of Beds		Beds per Death	
		N	W	N	W	N	W
1930	28	517	358	40	60	0.08	0.18
1939	28	376	266	80	129	0.21	0.48
1939	61	682	470	279	547	0.40	1.16

tinued to decrease and that, as a whole, the Negro rates for the South are much lower than those for the North. The causes of this downward trend and this differential are not known, and it might well be of some interest to develop mass surveys in selected rural areas to gain a true insight into the tuberculosis problem among rural Negroes, just as has been done for syphilis.

2. Venereal Diseases — The Negro seems to fare somewhat better in the programs for venereal disease control. Comparing 32 counties in 1930 and 1939 (Table 4), it is found that, on the basis of population, the Negro had available many more clinic hours per week than white persons. In 1930, this was 15.2 per 100,000 for the Negro and 7.3 per 100,000 for white persons, or a ratio of two to one. By 1939, these services had increased almost fourfold for both groups, so that Negroes had available 63.9 clinic hours per week per 100,000, as compared to 26.0 for white persons. It must be kept in mind that the gains during this 10 year period may not be quite this much, since the same population totals were used for 1930 and 1939; even so, there appears to have been marked progress in this field during this 10 year period. This same advance is of course to be noted when all of the counties which reported data for 1939 are considered. Here, again, the Negroes have twice as many clinic services as white persons. This forward march is also noted from another angle. In 1930, of the 32 counties, 17 did not have any venereal disease clinics for either racial group. In 1939, of the same 32 counties, only 4 reported in the negative. This is even better when all of the 63 counties reporting in 1939 are considered, for in this group only 4 had no clinic facilities for Negroes, but 8 had none for white persons.

TABLE 4

Venereal Disease Clinic Facilities in 1930 and 1939

Year	Counties Reporting	Population		Clinic Hours per Week		Clinic Hours per Week per 100,000	
		N	W	N	W	N	W
1930	32	421,025	826,533	64	60	15.2	7.3
1939	32	421,025	826,533	269	215	63.9	26.0
1939	63	951,855	1,674,222	519	413	54.5	24.7

This remarkable achievement during this decade must be attributed to the tremendous emphasis which has been placed on venereal disease control since 1935. One must not lose sight of the fact, however, that the proportion of facilities is not yet equivalent to the ratio of the venereal disease rate of Negroes to that of white persons. It has often been repeated for instance that six to ten times as many Negroes

TABLE 5

Prenatal Clinic Service Available in 1930 and 1939

Year	Counties Reporting	No. of Live Births		No. of Clinic Hours per Week		No. of Clinic Hours per Week per 1,000 Live Births	
		N	W	N	W	N	W
1930	21	7,046	9,855	13.2	9.8	1.9	0.9
1939	21	7,663	10,739	70.5	60.5	9.2	5.6
1939	50	14,863	21,039	148.5	131.0	9.9	6.2

have syphilis; therefore, a ratio of clinic services of two to one is still far short of the mark if need is the criterion of choice for the development of facilities. Also, it is to be emphasized that, even in 1939, almost 15 per cent of the counties had no clinical facilities for the control of venereal diseases.

3. Maternal and Infant Care — The problem of maternal and infant welfare is also of particular importance to Negroes, since their mortalities are generally twice as high as that of white individuals. According to Table 5, wherein 21 counties are compared for 1930 and 1939, it is found that, although Negroes had twice as many prenatal clinic hours per week for 1,000 live births as did white persons, yet the amount was far below the minimum of from 6 to 12 clinic hours per week per 1,000 live births suggested by Hiscock.[2] This was also true for the white population. By 1939, however, there was a sizable increase for both groups in the same 21 counties, so that Negroes received 9.2 clinic hours per week per 1,000 live births, while white persons obtained 5.6. Thus a five- and sixfold increase respectively was achieved for these two races in the decade 1930–1939, and the 21 counties in 1939 had apparently reached the suggested minimum level. This favorable position is also in evidence when all of the 50 counties which reported such services are analyzed. This advance certainly must in part be attributed to the recent stimulation given to maternal and child health programs through federal contributions under the Social Security Act promulgated in 1935. Without such financial stimulation it is to be doubted whether this marked progress would have taken place. Again, a word of caution must be interjected here. In 1939, 16, or about one-third of the 50 counties, reported no prenatal clinic facilities either for white or Negro pregnant women. If this is the situation in full-time county health units, what then must be the outlook in counties with no such organizations?

The proportion of babies delivered in hospitals and by midwives and the number of midwives in the community are also measures of evaluation of maternal and infant hygiene programs. In these spheres the Negro suffers by comparison. In Table 6, the percentages of babies delivered in hospitals and by midwives is considered. Fifty-four, or 86 per cent of the 63 counties, reported that in 1939 less than 10 per cent of the Negro babies were born in hospitals. If this group is further analyzed it is found that 22 of the 54 counties, or one-third of the 63 units, had no Negro hospital deliveries in 1939. For the white population, on the other hand, only 21, or one-third of the counties, had less than 10 per cent of their white babies delivered in hospitals. Of these 21, only 6 counties reported no white hospital deliveries.

It has often been said that the majority of Negro babies in the South are delivered by midwives. This table supports this contention. In 1939, 13, or one-fifth of the counties, reported that

TABLE 6

Per cent of Babies Delivered in Hospitals and by Midwives in 1939

	Race	Counties Reporting	Per cent of Babies Delivered in Hospitals					Counties Reporting	Per cent of Babies Delivered by Midwives				
			0-9	10-19	20-29	30-39	40 and Over		0-19	20-39	40-59	60-79	80-100
Number of Counties	N	63	54	3	2	1	3	68	13	3	5	21	26
	W	63	21	15	9	14	14	68	54	9	2	2	1

less than 20 per cent of their Negro babies were delivered by midwives; on the other hand, 80 per cent of the counties stated that this was true for white mothers. Furthermore, 26, or more than one-third of the counties, reported that 80 per cent of the Negro deliveries were attended by midwives, while only 1 county reported such a high percentage for white mothers. This condition is typical of practically the whole South, as shown by the report of the Bureau of the Census.[3]

The number of midwives in these counties is part of the whole picture and may be briefly described. In 1930, 57 counties reported a total of 2,938 midwives; these same counties in 1939 stated that they had only 1,943 of these individuals, or a decrease of more than 35 per cent. Using a population estimate of 943,274, we find that in 1930 there was 1 midwife for every 321 Negroes, while in 1939 this ratio had decreased to 1 per 485. This latter ratio holds true when all of the counties, 89 in number, reporting for 1939 are considered. With a total population in that year of 1,275,830 Negroes, they had 2,772 midwives, or 1 for every 460 persons. During the period 1930–1939, 8 of the 54 counties showed an increase in the number of midwives; 3 remained the same; 43 showed a definite decrease.

Registration and supervision are essential aspects in the program for continuous improvement of the midwife and therefore should be in force in every community. Of 87 counties, 80 have undertaken such a program, but 7 still neither register nor supervise their midwives. Of 71 which have this program of supervision, one-half instituted it during the decade 1930–1939; 3 previous to 1920, and the rest in the decade of 1920–1929.

It appears to us that for some time to come midwives, like poor relations, will always be with us; and certainly in many areas they fill a much needed gap in the number of professional personnel and the availability of services. This being the case, every attempt should be made by all health units confronted with this problem to develop plans for their improvement. This should be done by supervision, classes, and inspections. In addition, the utilization of trained nurse-midwives will help in supplementing and aiding this service.

4. School Hygiene—It was very difficult to analyze the data in this sphere of activity because of the meagerness of the information received. This incompleteness may signify that such programs have not been fully developed and are in the rudimentary stages; or that data separated on the basis of race are not available. The former statement is no doubt the truer explanation, since Negro children, with the exception of mass immunization procedures, are as a general rule ignored in the formulation of school health programs.

The analysis of the data available shows that the health programs for Negro children consist in the main of visits by nurses. In 1930, of 37 counties, 21 reported that 100 per cent of the Negro schools were visited. However, in that year, 8 of the counties reported that Negro schools had not been visited, whereas the number for the white schools was 5. In 1939 conditions were somewhat better, since in 53 of 72 counties all of the Negro schools were visited and, for the white schools, the same held true in 61 counties. The number of counties reporting this deficiency in Negro schools was 5, while only 3 admitted such a lack in white schools.

The examination of school children is an important aspect of this whole program. Within itself it is an important educational procedure. In 1930, 12, or 40 per cent, of 30 counties stated that Negro children were not examined, while only half this number reported the same for white children. The rest of

the counties reported various figures ranging from 8 to 100 per cent. In 1939 some progress is noticed. Eleven of 58 counties reported that no Negro children had been examined, but for the white children only 1 county admitted this deficiency. Thirty-eight of the 58 counties examined 50 per cent or more of their white children, but only 23 reached this level for Negro children.

Dental services which may be considered part of this program show an even greater lag for both white and Negro children. In 1930 all of the 27 counties which reported on this phase admitted no dental services for Negro children. Of these same 27, 3 admitted having services available to white children; 1 had given services totalling 748 items; another relied on the State Health Department trailer, and the third had its own clinics. By 1939 this picture had changed a little for the better. Of 44 counties reporting, 12, or about 30 per cent, provided dental services for Negro school children. These 12 counties which are listed below reported an approximate total number of 5,500 items of service.

COUNTIES REPORTING DENTAL SERVICES FOR NEGROES

1. Jefferson, Ala.
2. Orange, Fla.
3. Worth, Ga.
4. Caldwell, Ky.
5. LaSalle, La.
6. St. Martin, La.
7. Anne Arundel, Md.
8. Pitt, N. C.
9. Columbus, N. C.
10. Berkeley, S. C.
11. Hardeman, Tenn.
12. Albemarle, Va.

More services were, of course, available to white children in 1939. Of the 44 counties, 24, or more than 50 per cent, reported dental services for this group to the extent of 30,000 items.

Although progress is shown in the availability of dental services for Negro and white children, yet the amount of services rendered is still very meager when compared with the total school population of these counties. This is particularly true in the case of Negro children. This problem, like others, needs to be attacked by health departments. The employment of more dental hygienists might partly solve this problem. This professional group could be used for screening children with defects while state or county trailers could engage in the follow-up work. These dental hygienists could also be used effectively for health education. Even though this approach appears quite feasible, nevertheless, there will always be two obstacles to the development of dental programs in schools: (1) the economic position of Negro rural families; and (2) the wide scattering of Negro schools in many rural communities.

Postgraduate Courses and Fellowships—An attempt was made to discover the availability of courses and fellowships for Negro personnel in these health departments. As a whole they are not plentiful. In the decade of 1930–1939, of 83 counties only 1 had offered postgraduate courses for Negro physicians; only 1 had done so for nurses, and 6 had offered courses for others; mostly midwives. These counties were more generous in awarding fellowships. Of 84 counties, 5 had granted 8 fellowships to physicians and 6 had granted 7 to Negro nurses.

SUMMARY

Ninety-six southern counties with full-time health units were investigated by the questionnaire method in reference to the progress which had been achieved during the period 1930–1939 in certain public health services available to Negroes and white persons.

The analysis reveals that, during the decade in question, progress has taken place along several avenues, but this has been slow in pace and meager in quantity when compared to the number

and magnitude of the health problems facing Negroes in the rural South. Some advance has been made in the provision of clinic services for Negroes and white persons in these areas, but still too many communities are without adequate clinic facilities. This appears to be true particularly of truly rural counties with small populations. This fact has already been emphasized in a recent study which concluded: "Lack of clinic service to support the educational work of public health agencies is an outstanding deficiency of health organization especially for counties in the lower population group." [4]

Although tuberculosis is the foremost plague of the Negro, yet in this group of counties, he has available less clinic service and fewer beds per death. In the venereal disease field the Negro fares better—most likely as the result of the recent crusade—since he has twice as many clinic hours allocated to him per week as do his white brethren; but even this is not in proportion to the disparity existing between the incidence in the two races. The same outlook is to be found in the maternal and child health sphere. This study showed alarming neglect in the health supervision of Negro school children. In 1939, 11 of 58 counties reported no examination of Negro school children, while only 1 reported this deficiency for white school children.

On the basis of the analysis and opinions expressed by county health officers one may state that, in addition to the needs of clinic services for venereal diseases, tuberculosis, and the prenatal and postnatal stages, there is also a dire urgency for the development of a comprehensive approach to the manifold health problems of the Negro. What has been gained, may we ask, in a public health way when it is recorded in the files that a man has received 20 injections of bismuth and 20 of neoarsphenamine, and therefore has been discharged as adequately treated for syphilis, if his nutrition is poor, his teeth are decayed, his health habits are atrocious, he is diabetic, and his house is not properly screened?

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Evaluation of Health Services in a National Emergency*

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AGAIN I am back at the scene of my former activity in the public health field. One of my early assignments from the U. S. Public Health Service was to the State of Missouri. That was in the early 20's. In those days the disappointments and failures attending public health work far exceeded the actual accomplishments. Today, coming from Washington, I assume I am privileged to point with pride and view with alarm. I should like, with your permission, to do the former first.

If conditions today were less critical—if I were less actively identified with matters of immediate importance—I should like to spend this time reminiscing. I even believe we might derive some profit from such a backward glance. But reminiscences are hardly appropriate under present circumstances. Nevertheless, before passing on to a discussion of current problems, I should like to say a few words about the past.

When this association was formed, few had any idea that it would develop into the large and influential organization represented here today. At the early conferences, the speakers as well as the audiences consisted mainly of the founding fathers themselves. When compared with the many and complex tasks facing us today, the matters which concerned us then appear relatively simple. Moreover, resources for public health activities were extremely limited. When I was sent to Missouri, the state biennial budget for such activities amounted to some $60,000 or $70,000. Actually, a large part of this amount was collected by the State Board of Health in the form of medical licensure and vital statistics fees, and went back into the state treasury. The board of health was vested by law with broad and equally vague powers and duties, but in fact it was an organization which passed upon applications for licensure and drew up resolutions upon which local governing agencies might act. In addition, it performed the rather prosaic function of collecting records of births and deaths. The local health officer was a part-time official who held nominal office and who was appointed merely in order that the statute might be fulfilled.

My function as a federal official detailed to Missouri was to stimulate a movement for expanded local health organization. I might better say that my function was to explore the basis for such a movement and to seek out the local resources for getting it under way. I did not come as a Santa Claus bearing offerings and material assistance from Uncle Sam, in the manner of federal officials today. At that time my organization, the U. S. Public Health Service, felt it was extending itself to the utmost by sending one young, inexperienced officer to give such advice and moral support as he could. From that point on, the job consisted chiefly of per-

* Presented before the Missouri Public Health Association at the 18th Annual Meeting in Kansas City, Mo., May 8, 1942.

suasion, of beating the bushes for any and every kind of facility or support, and getting local appropriations.

Since those early days the public health services of this country have been greatly extended and improved. Increasing state and local determination to face health problems effectively has been supported by substantial financial aid from the federal government. Instead of a biennial budget of $60,000 or $70,000, state funds budgeted for public health activities in Missouri during the current fiscal year alone amount to approximately $170,000. This sum is augmented by local funds totaling $1,073,000. In addition, federal funds budgeted for health services during the year amount to slightly more than three-quarters of a million dollars. Thus, the total annual public health budget in Missouri for the present fiscal year is approximately $2,031,000.

Missouri has done better than some states and not so well as many others in contributing to its own development. The health organization of the country as a whole is still highly uneven. Of the 3,070 counties in the United States, 1,669, or about 54 per cent, were organized under some form of full-time local service on June 30, 1941. For the most part, these organized counties are the populous ones; therefore the proportion of the population served is much greater than the proportion of jurisdictions involved. Since June 30, 1941, full-time service has been extended to more than 100 additional counties. The total coöperative health budget for the fiscal year 1942, including federal, state, and local funds, as reported to the Public Health Service, is almost $119,000,000.

Of course, there is room for a great deal of improvement. The fact that more than one-half of our counties are covered by full-time local services conveys a mistaken impression unless it is pointed out that in many counties only limited services are performed by skeleton organizations which may be said to have little muscle covering the bones. But this is no time to recount past successes and failures. Nor is it a time to plan for the future in terms of the progressive evolution which has characterized the development of most of our American institutions.

We are now engaged in a no-quarter battle with an enemy who scorns these institutions and who is doing the utmost to insure that they will play no further part in world history. Whether we win or lose depends upon how quickly and effectively we can organize the entire nation with all its resources and skills for one supreme, coördinated victory program. The public health organizations of this country can no more escape the consequences of this total mobilization than can any other segment of national life. It is true that health services must be extended to many regions which formerly had few inhabitants but which are now teeming centers of military or industrial activity. But a more immediate responsibility, and one which has even greater bearing on the future of our country, is the fullest possible utilization of the public health structure now existing in the more populous sections of the nation.

This means that health departments must subject every aspect of their programs to scrutiny in terms of war-connected need. Cherished plans may have to be given up, and projects which cannot be justified directly as war measures may have to be abandoned. Accustomed ways of doing things will have to be altered so that things can be done quickly. I do not need to tell you how late we are as a nation in getting this type of conversion under way. The reverses suffered by our armed forces and those of our allies is ample evidence of our tardiness.

While curtailment of certain activities will be necessary, prompt and vigorous

undertaking of many new activities is imperative. I believe it is correct to say that no other type of agency is better adapted organizationally and legally to the assumption of these emergency duties than the health departments. A declaration of the American Public Health Association, adopted in December, 1941, states:

"The effective modern health department, as now conceived and at present organized in many states, cities, and counties as a branch of civil government, comprises a medical, sanitary, and related biological and social competence which enjoys broad authority to meet a wide variety of medical and environmental emergencies. . . . the health officer and his staff must be alert to extend, and, if necessary, to modify the usually accepted health functions to meet the multitude of exceptional situations certain to be created by the state of war and by the mobilization of all the people and their industry to support the armed forces."

This is a call for direct action, for the assumption of larger responsibilities, and for greater vigor in all essential activities. In recent years, health departments have sought to accomplish results chiefly by means of persuasion. Such a method may have been appropriate when we could afford to proceed on the assumption, however fallacious, that people had only to be told what to do and that somehow or other the wherewithal to do it would be forthcoming. The time when we could proceed on such a basis, however, is gone, and it may never return—at least not in our generation. Today, direct administrative action is required; the processes of education are too slow. Free enterprise cannot be expected to adjust itself automatically to a situation which is national in scope and character, or to undertake on its own initiative action which does not serve its own immediate interest.

What are the "exceptional situations" referred to in the declaration of the American Public Health Association which I just quoted? First, I would call attention to the matter of law enforcement. As stated by the declaration, the authority granted to health departments is very broad. While it may be said to the credit of health agencies that they have not abused this power, they may, on the other hand, justly be condemned for not having exercised it sufficiently when needed.

Today people are literally begging to be directed in constructive action which will promote success in the war. The various polls and barometers of public opinion consistently show that the people as a whole are far ahead of the framers of public policy in their willingness to surrender customary rights and privileges for the common cause. But, in order to make use of this popular disposition to sacrifice and help, some form of organizing and directing authority is needed. I am sure that if health departments merely undertook aggressive enforcement of existing laws and regulations, if they made use of the authority already vested in them, many of our most vexing problems would be resolved immediately.

This type of action does not require the time-consuming conferences and surveys which have constituted such a large part of the work of health agencies during the past 25 years. Needs have been established which we could not meet in peacetime, let alone now. A recent study of selective service physical examinations in Hagerstown, Md., showed that physical defects for which selectees were disqualified had been discovered in school surveys years before. Recommendations for correction of these defects had been made, but nothing had been done in most cases. Unless the means are at hand to correct the conditions uncovered by surveys, there is certainly no justification for

conducting them at this time. Health departments might better devote their attention to conditions which they are in a position to remedy.

This brings me to a fundamental fact which I have been emphasizing for years. That is, the health of the community rests on two basic factors: environmental sanitation and medical service.

We want sanitation, and we must have it. I have already mentioned how much could be accomplished in this respect by adequate law enforcement. But we cannot overlook the fact that, in order to put many premises into good sanitary condition, construction and installations are necessary. At the present time this brings us face to face with the many restrictions imposed on the procurement of materials, supplies, and labor. In making recommendations to property owners and occupants, these restrictions must be kept in mind. There is little point in telling a dairyman to install stainless steel pasteurizing equipment or in advising a restaurant owner to put in a mechanical dishwasher when these products have been taken off the market. We had sanitation before many of our modern improvements came into being. Until the new and improved products are available again, we will have to make the old ones do. I will even venture the possibility that before this war is over some of our sewage may again have to be carried in open ditches.

As the war progresses, the shortage of physicians, dentists, nurses, and the various technicians who play a part in medical service will become increasingly acute. Time will not permit me to dwell on methods of meeting shortages of personnel in all the professional branches, but what I say about physicians will apply to the others as well.

Many communities will be depleted of the physicians now practising there. In scarcely a town will there be found the empty waiting rooms which we heard so much about a few years ago.

What are you going to do about it? Traditionally health departments have not concerned themselves with problems of medical care, except in so far as they are related to certain diseases and certain limited groups in the population. Today, however, the national interest requires broader participation in this form of activity.

In many places throughout the country large military camps have been established in sections where facilities for medical care are lacking or inadequate. The safety of both military and auxiliary civilian personnel requires that this need be met. The same is true in communities now devoted to the manufacture and assembly of essential war materials. The people working in these communities must be kept in good health and at a high level of efficiency. If a machine is idle because the worker who should tend it is sick, that machine is doing a job for Hitler. Yet, today there are such communities without physicians, and there are others where the ratio of physicians to population is as low as 1 to 3,000. Hours which could be devoted to work are spent in crowded waiting rooms of doctors who are perhaps too busy and exhausted to give satisfactory care. Worst of all, under such circumstances, days and weeks of valuable working time are lost when neglected minor ailments result in serious illness.

Then there is that vast reservoir of young man power now kept from active military duty because of remediable physical defects. Rehabilitation services which will make these men available are needed at once. It is recognized, of course, that doctors cannot be trained and provided in a few months' time. The obvious way of meeting the situation, therefore, is to streamline and utilize whatever resources we now have, to organize medical service around clinics where necessary, and to supple-

ment the higher skills with lesser ones. In short, in these critical localities, medical services must be developed on a wholesale rather than a retail basis. The official health agencies must initiate or at least take an active part in the reorganization of medical services wherever present deficiencies interfere with war work. The same applies to the provision of hospital facilities. In many instances health agencies may have to engage in direct operation of hospitals. They may also be called upon to operate new or expanded sanitation facilities.

The people of the nation quite naturally look to the health departments for technical assistance in the organization and operation of civilian defense programs. Here is a new field of endeavor involving many time consuming obligations. But it is also a field which presents unparalleled opportunities for enlisting public coöperation and support.

Unfortunately it is customary to think of additional personnel as a natural corollary to additional duties. Not only are larger staffs impossible at present, but health departments may expect to lose many of the professional workers they now employ. These workers—physicians, nurses, and engineers—all possess experience and skills urgently needed by our fighting forces. They cannot be retained in their present capacities simply because they are performing socially useful work. Unless they are actually doing work that is *more* important than what they could be doing with the armed services, the health department has no right to retain them.

How then are the increased duties to be performed? It is obvious that everybody will have to work harder. I doubt if anyone will object to that. But when I say that it will also be necessary to employ substandard or partially trained personnel, I am not so sure but that complaints may be forthcoming. Nevertheless, it is the only way the task can be done, and it must be done. At the present time, maintenance of the highest possible type of health services is not the chief consideration. The important thing is to see that necessary services *are* performed with whatever types of workers and facilities are available. Present well qualified staffs of health agencies must concentrate on training and supervisory activities, and routine duties must be performed by those with less skill and experience. The extent to which this dilution process will have to be carried out cannot be foreseen. It depends on the duration of the war and the demands of the army, navy, and war industries.

I am not proposing that merit systems of personnel administration, laboriously evolved, be scrapped. That is not necessary. The situation can be met by the creation of interim classifications, permitting the employment of substandard personnel for the duration of the emergency.

The health agencies of the country may not be permitted much longer to decide whether certain tasks should be done or not. If the tasks in question are essential to victory they will be done—if not by the health departments, then by some other agency or agencies. That is the only way in which the future of our country can be assured. And I believe it is fair to say that the future pattern of public health organization of this country will depend upon how health departments meet the challenge of the present situation. Either they will emerge from the war as stronger, more useful, and more respected servants of the common weal, or they will have been eclipsed by others who forged ahead while they lagged along at the usual pace.

Undoubtedly many of you are a bit dismayed by the magnitude of the tasks thrust upon you by the war. I wish, however, to call your attention to an-

other aspect of the situation. I believe you should consider yourselves both privileged and honored by the vital rôle assigned to you in seeing the nation through the most critical period of its existence.

You will have to endure many trials and disappointments. You may have to expend the last ounce of your energy in the service of your country. This, however, has always been the lot of men and women in key positions during the crucial periods of history.

Reports on Food Habits Available

THE attention of the Association has been called to the fact that the Committee on Food Habits of the Division of Anthropology and Psychology, National Research Council, 2101 Constitution Avenue, Washington, D. C., has available reports which will be of interest and concern to a variety of persons dealing with populations having national or racial food habits.

Among the reports available are the following:

"Italian Food Patterns and Their Relationship to Wartime Problems of Food and Nutrition."

"The Relative Effectiveness of a Lecture Method and a Method of Group Decision for Changing Food Habits."

"A Group Test for Determining the Anchorage Points of Food Habits."

Also conferences of the Committee on Food Habits relating to the contributions from the fields of child development and market research.

Vaccine Prophylaxis against Tularemia in Man

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IT is characteristic of tularemia that most patients develop a high degree of natural resistance after infection occurs. The mortality is low. Recovery confers lifelong immunity which protects against subsequent massive exposures with an effectiveness seldom encountered in bacterial diseases. Second attacks of disease are unknown. Local reinfections occur occasionally among immunes subjected to repeated exposures to virulent strains but, as Francis first indicated, they are either asymptomatic or associated with brief and mild constitutional symptoms.[1] One of us has recorded apparent immunity, due to vaccination, which successfully withstood accidental massive exposures to strains of high virulence.[2]

Although tularemia is of minor importance as a cause of death it has considerable social and economic importance in areas of high endemicity as a cause of prolonged morbidity and disability. Its capacity to disrupt normal activities of military encampments is recognized.[3] The extreme ease with which infection is acquired, and the high infection rates among butchers and market men, scientific investigators, rabbit hunters and their wives and cooks who prepare game for the table, indicate the desirability of better methods of protection than those now in use.

Preliminary experiments with heat killed and formalinized *Bacterium tularense* * suspensions demonstrated clearly that vaccines made by these methods, from either virulent or avirulent strains, provoked severe and extensive constitutional and local reactions upon initial injection into normal individuals. Reasonably well tolerated doses were so small that several months of daily injections were required to produce agglutinin titers to 1:320, a scheme tolerable for a few laboratory workers but impracticable for large scale use.

The successful efforts of Ramon and his associates to diminish primary toxicity of toxins and of various bacteria without significant impairment of their antigenicity, by various chemicals, led us to try similar methods. We established the following specifications for an acceptable vaccine:

1. It should be capable of subcutaneous administration, being well absorbed and not producing sterile abscesses.
2. Toxicity upon initial injection must be diminished to a degree to permit a three injection scheme of administration.
3. The three doses must contain enough bacteria of sufficient antigenicity to confer protection.
4. Such doses must provoke no constitutional reactions nor severe local reactions.
5. The mode of preparation must be readily and reliably reproducible.

* Under the rules of uniform nomenclature adopted by the *American Journal of Public Health*, the name of this organism would ordinarily be classed as "*Pasteurella tularensis*."

After many trials on human volunteers with vaccines made by a variety of chemical procedures the vaccine which best satisfied our criteria was one made by oxidation of virulent strains by nitrous acid. This vaccine was adopted in 1932.

PREPARATION OF THE VACCINE

a. *Selection of cultures*

Only strains of high virulence were used. Virulence was maintained by frequent serial passage in guinea pigs, killing all animals within 96 hours after cutaneous inoculation. Virulence for rabbits was not determined regularly. Occasional trials showed that the strains used killed these animals within 5 days after cutaneous inoculation. Virulence was titrated regularly in white mice. Serial dilutions were made from a saline suspension having a turbidity equivalent to that of 500 p.p.m. of a fullers' earth standard (T-500). The acceptable range of virulence was that which killed all mice, in lots of 5, in dilutions of T-500 x 10^{-7} to 10^{-9}, in 0.5 ml. intraperitoneal doses. The average mouse virulence was T-500 x 10^{-8}.

During the first few years vaccine was made from eight strains. Since no antigenic strain differences were recorded, or found here, we used for three years a vaccine made from a single strain. Thereafter, with possible unknown strain variability in mind, the vaccine was composed of equal parts of four strains.

b. *Preparation of suspensions*

The 48 to 72 hour growth on blood-glucose-cystine agar was harvested in salt solution and filtered through cotton to remove particles of media. By collecting growth from several bottles or many tubes into one volume of salt solution an initial turbidity varying from T-12,000 to T-25,000 was secured. Turbidity was accurately determined and recorded, and the volume of suspension carefully marked. Tubes were then centrifuged until the supernatant was clear, after which it was discarded.

c. *Oxidation procedure*

For each 3 ml. of packed bacterial sediment 5 ml. of freshly prepared 30 per cent aqueous sodium nitrite was drawn into a finely tipped pipette. The bacteria were suspended uniformly in this solution by repeated expulsions through the pipette. Five ml. of 30 per cent acetic acid was then added. This solution was made on the assumption of glacial acetic as 100 per cent. For larger volumes of bacterial sediment the nitrite solution was added in proportion of 3:5. The volume of acetic acid solution was always equivalent to that of nitrite solution.

After addition of acid, evolution of gas was noted at once. The tubes or centrifuge bottles, carefully marked for original volumes, were stood at room temperature for 4 hours. During the course of the study it was found that oxidation for 4 hours produced maximal diminution in toxicity consistent with minimal loss in antigenicity. Removal of acids and salts was facilitated by adding sterile distilled water up to convenient capacity of the receptacles. For the first two washings this shortened the time for quantitative centrifugation of cells. Four washings were needed to remove all traces of acid. Sterile saline was used for the last two washings. Thereafter the bacteria were thoroughly resuspended in 0.5 per cent phenolized salt solution up to the marks of original volumes. Chemical treatment alters so greatly the refractive index of bacterial suspensions that turbidity measurements must be made prior to oxidation.

d. *Completion of the vaccine*

In accordance with initial turbidity readings each tube was then suitably

diluted with phenolized saline to produce a final theoretical turbidity of T-6,000 which is approximately equivalent to a density of 24 billion bacteria per ml. After the usual tests for sterility the vaccine was bottled and stored at 4° C. until needed.

Keeping quality at storage temperature is limited. When diluted 1:60 and used to provoke cutaneous reactions in infected or recovered individuals a sharp falling off in reactivity was noted after 13 to 15 months. We made a fresh supply each autumn and marked expiration date for 12 months.

METHODS OF STUDY OF THE VACCINATED GROUP

Selection of individuals

Vaccine was administered only to susceptible individuals exposed to risk of infection. Selection was entirely at random, and on a volunteer basis. Prior to 1937 a considerable proportion of the vaccinated group was composed of those occupationally exposed; butchers, market men, professional rabbit hunters, and seasonal game handlers. In 1937, a municipal ordinance prohibited the sale of wild rabbits. Since then there has been no occupationally acquired tularemia in Cincinnati; a record contrary to previous experience. Food handlers had no further need for vaccine. Coincidentally there was a great increase in requests for vaccination of amateur rabbit hunters, their wives and cooks. Thus the composition and probable exposure risk of the vaccinated group were significantly altered.

During the entire period of vaccine preparation all laboratory personnel handling virulent cultures and infected animals were vaccinated.

Vaccination records

Duplicate records were kept of all vaccinated individuals. The items recorded annually were: name, age, address, occupation, history of previous tularemic infection, the usual annual game bag, last year's total of rabbits killed; the dates of inoculation, size and number of doses, turbidity of vaccine, local and general reactions; also the results of agglutination tests and cutaneous tests, and notation of acquisition of tularemia after vaccination, with laboratory data.

Detection of recovered immunes among applicants

For reasons which will appear later great care was exercised to avoid giving vaccine to all who had had tularemia. Careful inquiry usually sufficed to detect recovered individuals, even though some did not know they had had "rabbit fever." When there was a dubious history we resorted to agglutination tests or cutaneous tests, withholding vaccine until final judgment could be made. In our hands these tests proved to be reliable indices of past infection.

Agglutination tests

Information concerning antigenicity of the vaccine was obtained by serum agglutination tests. By random selection individuals were examined for agglutinins each year. Eventually these results were grouped according to: (1) tests performed after initial vaccination, (2) tests prior to revaccination, and (3) after revaccination.

Detection of tularemia in the vaccinated group

Searching inquiries were made each year to discover tularemic infections among the vaccinated group. Since the laboratories of the Department of Health and of the Department of Bacteriology maintained free diagnostic services the great majority of all cases of tularemia were reported directly to us. Due to their own interest in the experiment most vaccinated individuals

promptly reported the occurrence of infectious disease. We believe our case finding methods disclosed every case among the vaccinated group, as well as the overwhelming majority of all cases in the community.

Study of the cases found

Every vaccinated individual who contracted tularemia was carefully observed with special reference to severity of infection, occurrence of visceral lesions, and duration of the various measurable clinical aspects of the disease for which we had control morbidity data.

Cases which occurred among vaccinated laboratory personnel were also studied carefully, and will be considered separately.

Administration of vaccine

Although the adoption of a maximal turbidity, and of a standard oxidation period, had to wait until experience indicated what was optimal the mode of administration remained uniform. Three doses of 0.5 ml. each were injected subcutaneously and alternately into the arms, on either consecutive or alternate days. It was found advisable to complete administration within a 6 day period. A delayed third injection frequently provoked constitutional reactions and unduly large local reactions. Otherwise constitutional reactions were extremely rare, and local reactions were moderate. The necessity for lay-off from customary work did not arise. During the past five years this standard dose contained a total of 36 billion bacterial cells. The ratio of the tolerance dose of this vaccine to that of formalinized vaccine is 1,200:1.

Revaccination dosage

No constitutional reactions were observed upon revaccination prior to the introduction of the T-6,000, 4 hour oxidized vaccine. After its adoption, constitutional reactions were provoked by the initial dose of 0.5 ml. of the second annual series in about 60 per cent of individuals. This necessitated revision of the schedule for revaccination. Thereafter all applicants were given a trial first injection of 0.25 ml. The second and third doses varied in accordance with appearance and degree of reactions. If both general and local reactions were marked, no more vaccine was given that year. If there was no general reaction but marked local reaction, the subsequent doses were 0.25 ml. each. If neither general nor undue local reaction occurred the subsequent

TABLE 1

TABLE 1 shows for each year the turbidity of tularemic vaccine used, its duration of oxidation, number of persons vaccinated and revaccinated, and the maximal number exposed to risk of infection.

Vaccination of Applicants

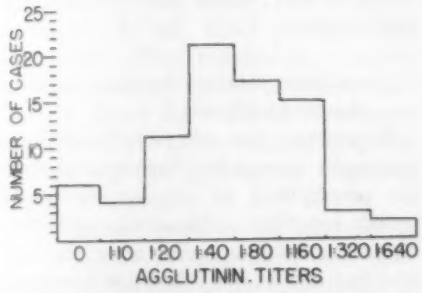
Year	Vaccine		Applicants		Percentage Revaccination for Each Year	Cumulative Total of Individuals Vaccinated
	Turbidity	Hours Oxidized	Vaccinated	Revaccinated		
1933	1,000	16	72	0	0	72
1934	3,000	16	267	15	5	339
1935	3,000	18	48	8	14	387
1936	3,000	4	106	21	17	493
1937	6,000	4	123	53	30	616
1938	6,000	4	118	84	42	734
1939	6,000	4	732	176	19	1,466
1940	6,000	4	224	301	58	1,687
1941	6,000	4	458	339	43	2,145
			2,145	997		

doses were 0.5 ml. each. This plan gives maximal protection at minimal physiologic cost. Variations in density and oxidation periods of the vaccine are shown in Table 1.

Vaccination of recovered immunes

It is unnecessary and inadvisable to vaccinate persons who have recovered from tularemia. Since they are already protected for life the general and local reactions of unusual severity which inevitably follow serve no useful purpose. Since residual serum agglutinins are almost invariably present after recovery, and since cutaneous sensitivity is almost always present for many years thereafter, accurate methods for the detection of immunes are readily available. Where agglutination tests cannot be had, the vaccine should be diluted 1:60 with salt solution and injected intradermally in 0.05 ml. amount, and the site examined 48 hours later.

FIGURE 1



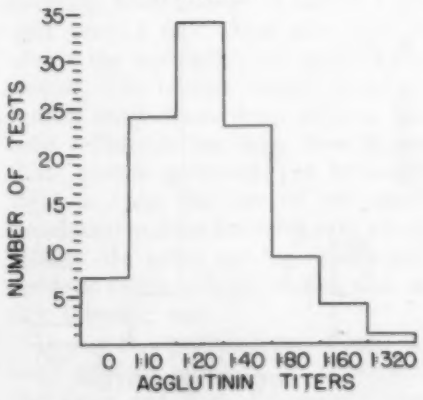
Agglutinin titers after initial vaccination: 79 individuals.

Although we exercised great care to avoid vaccinating immune persons we committed this error five times. The reaction of one man was typical of all. Eight hours after injection he had a severe chill, a splitting headache, and severe bodily pains. The temperature was 104.8° F. After an hour he vomited, and continued to vomit even water for the next 48 hours, during which fever continued with recurring chills and sweats, agonizing headache, and intense pains in all muscles and joints. He exhibited alternation between hypomanic activity and confused, stuporous delirium. On the 3rd day the general reaction abated, and after the 4th day recovery was prompt and uneventful. At the height of reaction the entire upper arm was enormously swollen, presenting the picture of a severe Arthus reaction with central pallor and liquefaction necrosis. The regional axillary nodes were large, painful, and very tender. The local reaction persisted for 9 days.

Agglutinin titers after vaccination

Serum agglutination tests were performed by the standard macroscopic method. Figure 1 shows the titers observed in 79 individuals after initial vaccination. Blood samples were taken from the 6th to the 44th day after the third injection, the majority from the 10th to the 18th day, the largest number on the 14th day. Under these conditions agglutinins were present in 92 per cent of sera. Positive titers ranged from 1:10 to 1:640; the greatest number being 1:40. Highest titers were obtained during the 3rd week after vaccination.

FIGURE 2



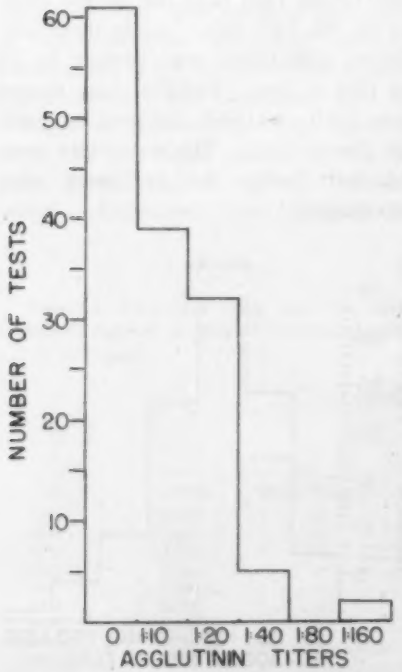
Agglutinin titers after revaccination. 102 tests.

Agglutinin responses after one or more revaccinations were measured in sera obtained from the 2nd to the 48th day. The largest number of samples was secured during the 3rd week after inoculation. Agglutinins were present in 93 per cent of sera. Positive titers ranged from 1:10 to 1:320; the greatest number being 1:20, as shown in Figure 2.

Persistence of agglutinins provoked by vaccination

Since naturally acquired immunity is accompanied by persistence of serum agglutinins we measured the residual titers one year after vaccination. Figure 3 shows the titers found in 138 tests of sera obtained just prior to revaccination. Agglutinins were present in 56 per cent of sera. Positive titers ranged from 1:10 to 1:160; the largest number being 1:10.

FIGURE 3



Agglutinin titers 1 year after vaccination. 138 tests.

Evidence for immunity derived from constitutional reactions

Constitutional reactions were provoked only by revaccination, not by initial vaccination unless the last dose was delayed beyond the recommended interval. Although the intensity was much lower, the character of these reactions was identical with those produced by vaccinating an immune person. This suggested that some degree of residual immunity persisted for at least one year in about 60 per cent of those vaccinated. The agreement observed between the incidence of constitutional reactions occurring after revaccination (60 per cent) and the proportion of residual serum agglutinins (56 per cent) supported this suggestion, since almost every person who suffered a reaction had yielded serum, secured just before revaccination, which showed residual agglutinins.

Optimal time relation between vaccination and exposure

Experience does not permit a definite statement concerning the optimal time for prophylaxis in relation to anticipated exposure. Maximal agglutinin titers occurred 3 weeks after vaccination but it does not follow that maximal protection was conferred then. The majority of our people were vaccinated from 3 to 4 weeks prior to exposure. A number considerably in excess of 200 received vaccine within 48 hours of first exposure. None acquired the disease. Eight physicians, not included in the group under discussion, were vaccinated during possible incubation periods. Each had been contaminated, on the hands or in the eyes, with infected human exudates. None acquired the disease. We cannot say that any person in either of the above groups would have acquired the disease had he not been vaccinated. The risk was high but not certain. It was demonstrated that vaccination just prior to or im-

mediately after exposure did not have any adverse effect. In one instance we unwittingly vaccinated a hunter during the incubation period of a naturally acquired infection. Since he was febrile for only 8 days, never went to bed, and never laid off work for even a day, the effect in this patient was significant amelioration and shortening of the disease. We recommend that prophylaxis be completed at least 3 weeks before the anticipated exposure, but that there need be no fear of inducing harmful effects by administering vaccine immediately prior to exposure or during the incubation period.

Observations on the exposed vaccinated group

In the manner outlined above susceptible exposed individuals were vaccinated each year from 1933 to 1941, inclusive. In all, 2,145 persons were vaccinated. This number is exclusive of all professional groups or individuals. Table 1 shows the numbers of persons vaccinated and revaccinated, and the maximal number exposed to infection, during each year.

It was not possible to establish a control group of equivalent size consisting of persons given injections of inactive solutions or of heterologous vaccines. Even had we been able to do so we could not have obtained any precise knowledge of the relative exposure rates.

Exposure risk

If the ordinance forbidding sale of wild rabbits in local markets had not been passed we could have established relative exposure rates and disease incidence rates for the vaccinated and unvaccinated occupationally exposed groups. The total numbers of game handlers, of recovered immunes, and of wild rabbits handled each year were known. However, sales were stopped before the number of individuals involved and the duration of their experience were large enough to be significant. The impossibility of control of many important variables left us unable to estimate the exposure risk of hunters and housewives who formed the balance of the experimental group. Considerable information was acquired concerning the total number who hunted each year, the number of rabbits killed per year per hunter, the average infection rate among rabbits, and so forth; but in our opinion no manipulation of these figures would yield defensible data.

Fourteen vaccinated persons acquired tularemia. Table 2 shows the relation of these cases to the annual prevalence of disease, and its severity, among the general population in the area which supplied the vaccinated group. No inference concerning the relative incidence of disease can be drawn since the total number of exposed individuals in the general population is unknown. The figures are presented to show that tularemia occurred in this area during every year that the exposed vaccinated group was observed, and that the infecting strains were sufficiently virulent to give a case fatality rate of 7.6 per cent for the 9 year period. Absence of cases among vaccinated persons in 1939 is probably a reflection of the abnormally small number of rabbits found that year, a fact which also best explains the unusually low incidence of disease. In regions where almost all human cases derive from contact with wild rabbits it has long been known that annual prevalence of tularemia depends upon the size of the rabbit population and the infection rate among rabbits, the latter varying chiefly with the total rabbit tick population and the tick infection rate.

It may be significant that during the large regional outbreak of 1936, with 140 cases and 8 deaths, only 1 case occurred among those vaccinated. All

TABLE 2

In Table 2 for each year are shown the maximal number of vaccinated persons exposed to infection, incidence of tularemia and of deaths among those vaccinated; also the tularemic morbidity and mortality in the unvaccinated population of the same region.

	Experimental Group			*General Population (size unknown)*	
Year	*Number Exposed*	*Number Infected*	*Deaths*	*Cases*	*Deaths*
1933	72	0	0	29	0
1934	339	1	0	45	2
1935	387	3	0	24	3
1936	493	1	0	140	8
1937	616	2	0	26	4
1938	734	1	0	30	4
1939	1,466	0	0	8	1
1940	1,687	2	0	14	0
1941	2,145	4	0	41	5
		14	0	357	27

Case fatality rate 7.6%

TABLE 3

Incidence of tularemic infection in relation to quantity and antigenicity of vaccine, and to time of administration of vaccine. Vaccines with turbidities less than T-6,000, and those oxidized for more than 4 hours, were poorer immunizing agents.

In eight patients infection occurred one or more years after the last vaccination.

Infections among the Vaccinated

Case	*1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*	*1940*	*1941*
1	v (2)	0	0 x	....	....	....	....	....	....
2	v	0	0	v x	....	....	....	....	....
3	....	v x	....	....	....	....	....	....	....
4	....	v	0 x	....	....	....	....	....	....
5	....	v	0 x	....	....	....	....	....	....
6	....	....	....	v	0 x	....	....	....	....
7	....	v	0	0	0 x	....	....	....	....
8	....	v	0	0	0	v x i-p	....	....	....
9	....	....	....	....	....	v	0	0 x	....
10	....	....	....	....	....	....	....	v x	....
11	....	....	....	....	....	....	v	0	0 x
12	....	....	....	....	....	....	....	v	v x
13	....	....	....	....	....	....	....	v	v x
14	....	....	....	....	....	....	....	....	v x
Vaccine T—	1,000	3,000	3,000	6,000	6,000	6,000	6,000	6,000	6,000
Hours oxidized	16	16	18	4	4	4	4	4	4

v = vaccine administered
(2) = only 2 doses received
0 = no vaccine administered
x = tularemic infection
i-p = vaccine administered during incubation period

of the 493 individuals hunted or handled wild rabbits which were very plentiful that year.

Evidences of protection conferred by vaccination

The incidence of tularemia in the vaccinated group, though less than that anticipated, does not give reliable evidence of protection. More convincing evidence of the value of vaccination was obtained by study of vaccinated individuals who acquired the disease. Table 3 shows the intervals which elapsed between vaccination and infection.

During the course of this study one of us collected quantitative data on the measurable aspects of morbidity from 518 patients who had no treatment other than the usual symptomatic or expectant measures. These were collected to provide a standard American morbidity experience against which the results of any form of therapy or prophylaxis might be compared quantitatively. An analysis of these data, demonstrating their appropriateness for such use, has been published.[4] Table 4 shows comparable morbidity data from the 14 vaccinated, infected patients. The order of cases is the same as in Table 3.

Disability was measured by the number of days full-time work was not performed. Three patients worked uninterruptediy, and 4 others were disabled for 14 days or less. Nine were disabled for less than a month. The chief cause for prolongation of disability was suppurative lymphadenitis. In case 3 there was serial suppuration of twelve nodes. Pneumonia, with dry pleurisy, occurred once, in case 14. In over half of the cases fever was not only greatly shortened in duration but markedly ameliorated in degree, maximal temperatures being 102.5° F., or lower. In 10 patients there was striking amelioration of the customarily severe initial general symptoms, headache, arthralgias, myalgias, sweats, anorexia, and nausea. This was particularly impressive in those patients who

TABLE 4

Morbidity values were measured by the same method used for determination of morbidity constants in 518 control patients.[4] The low incidence of suppurative lymphadenitis in the next to last column has little significance in a series this small.

Duration of Measurable Aspects of Disease in Vaccinated Infected Patients

	Months' Duration			*Days' Duration*			*Supp. or*	*Serum*
Case	*Disease*	*Adenopathy*	*Disability*	*Fever*	*Bed*	*Primary Lesion*	*Not*	*Therapy*
1	2.1	1.5	0.7	10	16	69	+	+
2	1.6	3.0	1.6	12	7	43	0	+
3	4.4	4.4	0.5	8	3	..	+	+
4	1.0	0.8	0.8	16	15	9	0	+
5	1.75	0.5	0.1	4	4	29	0	0
6	1.9	2.7	2.7	24	26	30	+	0
7	2.2	2.2	1.25	21	21	30	0	+
8	0.3	1.5	0	8	0	26	0	0
9	2.3	2.3	0.5	28	12	..	+	0
10	2.0	2.0	2.0	60	25	30	+	0
11	1.2	2.9	0	21	0	22	0	+
12	0.75	1.4	0	7	0	15	0	0
13	1.0	1.2	0.5	14	7	30	0	0
14	2.3	2.3	2.8	32	32	21	0	+
Average	1.8	2.1	1.0	17.5	12	29.5	37.7%	50%

did not receive serum therapy. It should be noted that in general the shortest and mildest infections occurred in those who had had the most vaccine, and for whom the intervals between vaccination and infection were not longer than 3 months.

Seven patients received serum therapy. Indications for use of serum were presence of pneumonia, initial symptoms of usual severity, unusually large number of large buboes in the first week (with the hope of lessening disability due to suppurations), or the desire to ameliorate symptoms and shorten the duration of illness. It is probable that serum treatment contributed to the favorable modification in the course of disease indicated by the figures in Table 4. Re-grouping of data to permit comparison between patients who received serum and those who did not is shown in Table 5. Those who received no specific treatment exhibited significant amelioration and shortening of the disease.

A rough comparison of averages from the vaccinated infected cases with means from a large control group is shown in Table 6. Although durations of some aspects of morbidity were one-half to one-third of those for the control group, the small size of the vaccinated series does not justify overemphasis of the apparent value of vaccination, even though the probability of finding 14 consecutive cases of tularemia with such small morbidity constants by random selection is very remote.

Other evidence indicative of protection was obtained. Two identical experiences occurred several years apart, in which vaccinated susceptible butchers skinned and cleaned one rabbit for each of two customers. For each of the cus-

TABLE 5

Morbidity data regrouped with relation to specific serum treatment. The differences between the averages are probably not significant. The more severely infected patients received serum therapy.

Comparative Morbidity Data from Patients with and without Serum Treatment

	Months' Duration			*Days' Duration*			
Case	*Disease*	*Adenopathy*	*Disability*	*Fever*	*Bed*	*Primary Lesion*	*Suppuration*
Vaccinated Infected Patients Treated with Serum							
1	2.1	1.5	0.7	10	16	69	+
2	1.6	3.0	1.6	12	7	43	0
3	4.4	4.4	0.5	8	3	..	+
4	1.0	0.8	0.8	16	15	9	0
7	2.2	2.2	1.25	21	21	30	0
11	1.2	2.9	0	21	0	22	0
14	2.3	2.3	2.8	32	32	21	0
Average	2.1	2.4	1.1	17	13	32	28%
Vaccinated Infected Patients Not Treated with Serum							
5	1.75	0.5	0.1	4	4	29	0
6	1.9	2.7	2.7	24	26	30	+
8	0.3	1.5	0	8	0	26	0
9	2.3	2.3	0.5	28	12	..	+
10	2.0	2.0	2.0	60	25	30	+
12	0.75	1.4	0	7	0	15	0
13	1.0	1.2	0.5	14	7	30	0
Average	1.4	1.7	0.8	21	11	26	43%

TABLE 6

All means in the upper line are highly stable. For simplicity their probable errors were omitted. The vaccinated group showed favorable modifications in the important clinical and social aspects of morbidity.

Rough Comparison of Quantitative Data

	Months' Duration			*Days' Duration*			
	Disease	*Adenopathy*	*Disability*	*Fever*	*Bed*	*Primary Lesion*	*Suppurative Adenitis %*
A	3.8	3.4	3.4	32	31	39	56
B	1.4	1.7	0.8	21	11	26	43
C	2.1	2.4	1.1	17	13	32	28
D	1.8	2.1	1.0	18	12	30	36

A = Means from 518 untreated control cases
B = Averages from 7 vaccinated infected patients, without serum therapy
C = Averages from 7 vaccinated infected patients, with serum therapy
D = Averages from all 14 vaccinated infected cases

tomers the rabbit was the only exposure to infection. Both butchers remained well; each of the customers acquired tularemia. Similar experiences were reported many times by members of hunting groups. Those previously vaccinated remained well, even though they cleaned all rabbits shot by the party, whereas one or more of the unvaccinated members contracted tularemia several days later.

Experience with vaccinated laboratory workers

Work with virulent cultures of *B. tularense* does not carry much risk of infection but it is well known that handling infected animals and carcasses entails great risk, amply confirmed by the large number of laboratory infections acquired by well trained, experienced investigators.

Since 1929 our laboratory has had 9 persons exposed to tularemia by the handling of infected animals or, very recently, of virulent cultures in liquid media. Four of us have been exposed for 12, 8, 7, and 3 years, respectively. Two others were exposed for 2 years each, and the last 3 for 1 year each. Our original plan was to administer vaccine to each exposed person annually in the fall. During recent years, when the risk of contamination was known to be very high throughout the entire year, supplementary small injections of from 0.10 to 0.25 ml. of the vaccine were given every 3 or 4 months.

By oversight an animal caretaker who assisted in inoculating hundreds of animals annually was not vaccinated during the 2 years following his initial series. Vaccine was given in 1938, but inadvertently omitted in 1939 and 1940. He acquired the typhoidal clinical type in 1940, developing pneumonia and considerable pleural effusion. *B. tularense* was recovered by blood culture on the 16th day of disease, the day serum treatment was instituted. He was ill for 1.8 months, disabled for 2.3 months, in bed for 29 days, of which 22 were febrile days. The serum agglutinin titer was complete in dilution of 1:10,240 on the 40th day after onset. Recovery was uneventful.

For the rest of us who received vaccine according to schedule the experience was far better. Two other men acquired the infection; the remaining 6 have escaped despite a considerable number of recognized contaminations with strains of maximal virulence, of which 3 could be properly described as massive.

The two additional laboratory infec-

tions displayed such marked evidences of protection that they deserve detailed description.

I. W. G. was vaccinated in 1939 before working with virulent cultures in aerated liquid media. During the next year he worked with other materials and was not vaccinated. He resumed work with *B. tularense* in 1941, and was given six 0.25 ml. injections of vaccine. Three months later he crushed a glass bulb culture tube in his right hand, a piece of glass penetrating the palm to a depth of about ⅛ inch. The bulb was half filled with a 48 hour culture of a strain which killed all mice at 10^{-8}, and 60 per cent of mice at 10^{-9} dilutions, respectively. The wound was washed with soap and water. Immediately after the injury he received 0.10 ml. of vaccine into the right arm. On the following day he received 0.25 ml. into the left arm.

After an incubation period of 4 days he experienced a few chilly sensations, headache, aching of all joints of the right arm, and persistent interscapular backache. A very small reddened papule appeared at the site of injury; no lymphangitis or lymphadenitis. For the first 3 days he ached, felt "rocky," occasionally slightly chilly, and had low grade fever; no chills or sweats. He continued to work, complaining of occasional pain in the right axilla where no masses could be felt. Late in the 3rd day the nodule at the inoculation site measured 1 cm. in diameter, with a 3 mm. necrosing central area, the overlying skin yet unbroken. One node, 4 mm. in diameter, was felt in the right axila. After painting with tincture of iodine the central necrotic area was carefully aspirated with a small needle. The material obtained was cultured, and a portion triturated in salt solution and injected into a guinea pig. After 3 days the cultures showed six colonies of *B. tularense;* nothing else. The guinea pig died in 96 hours and showed the typical gross lesions of rodent tularemia. Pure cultures of *B. tularense* were obtained from its heart blood at autopsy.

The 5th day of disease was spent at home, due to fatigue and a mental "grogginess" which prevented clear thinking. He returned to work the next day, working almost two-thirds full time for 7 days. Thereafter he worked full time. Despite the needling the primary lesion did not ulcerate or further enlarge. Final healing, with slight scar, occurred on the 26th day. Four days after its appearance the enlarged axillary node measured 2 x 1.5 x 1.0 cm. Four days later it was less than 0.5 cm. in all diameters. It receded gradually without reënlargement, and became impalpable on the 26th day. Low grade fever, averaging 100° F., persisted for 10 days. After that he was completely afebrile. On the 23rd day after initial symptom he developed a crop of typical erythema nodosum lesions, from just above the knees to the ankles, which persisted for 8 days. The maximal serum agglutinin titer was 1:1,280, on the 26th day after initial symptom. Beginning a month later he had two afebrile, symptomatic relapses, about 12 days apart. Each lasted for 1 day. The symptoms were fatigue, heavy sensation in the head, marked malaise, and slight arthralgias. Four additional recrudescences, each of only a few hours' duration, occurred about a week apart during the next month. For the past 6 months he has remained well.

In October, 1941, W. H. H. was inoculating large animals with saline suspensions of living strains of 10^{-9} virulence for mice and guinea pigs. While injecting a goat with 3 ml. of a T-2,000 suspension of a 48 hour culture (about 8 billion bacteria per ml.) the needle was forced off the syringe tip, back-firing the entire contents into the face of the operator. Some liquid was felt to enter each eye; the re-

mainder streamed down over the mouth, neck, and chest. Within 15 minutes the face was washed with soap and water, a drop of 20 per cent argyrol was instilled into each eye, and 0.10 ml. of vaccine was injected into each arm. Three days later a third dose of 0.05 ml. of vaccine was given.

This man had been vaccinated once or twice annually for 7 years, the last injection 6 months prior to the accidental exposure.

Since past experience had shown that antiseptic or germicidal collyria possessed little value, ambulatory treatment consisted of thorough flushing of the conjunctival sacs with boric-saline solution five times during the first 2 days. No other treatment was administered.

On the second day after exposure both lower lids, and the right upper lid, were erythematous and edematous. In each conjunctival sac there were many minute oval, gelatinous, elevated areas of localized edema on erythematous bases. None showed erosion of the surface. There appeared one small red papule on the right cheek. There were no constitutional symptoms, fever, or regional lymph node enlargements. Smears of the conjunctival fluid showed a few small bacilli consistent in size and staining with *B. tularense*. A guinea pig was injected with material swabbed from both lids of the right eye. This animal remained well.

On the 5th day a single yellow-gray nodule appeared in the mucosa of the right lower lid, surrounded by a red, velvety, inflammatory area. The focus of necrosis measured 3 mm. It was larger on the next day. Each morning the lids were stuck together with exudate. They were still thickened and discolored. The papular cheek lesion disappeared.

The solitary primary lesion enlarged during a period of 3 days, after which it receded rapidly, and disappeared on the 9th day after exposure. At this time the entire area was normal in all respects. There was complete absence of fever, regional adenitis, and all constitutional symptoms. Work was continued energetically throughout the entire period.

Although the organism was not recovered by animal inoculation the serum agglutinin titer of the man rose from 1:80 4 months prior to the accident to 1:640 at 3 months after the local infection. Apparently vaccine had induced such a high degree of resistance that a massive contamination of both eyes resulted only in a solitary abortive primary lesion in one eye, possibly another on the cheek, without regional lymphatic extension and without the production of constitutional symptoms. The sequence of events, save for the site involved, was identical with some of the local reinfections seen in recovered immunes and described by Francis.[1]

All laboratory infections reported hitherto have presented the typhoidal clinical type of disease. The last two of the three cases reported here differ in that one was ulceroglandular and the other ocular.

The complete freedom from infection of three of us with a total of 23 exposure years, and the extraordinary degree of favorable modification of disease in the above two cases, are scarcely conceivable for tularemia as results due to any cause other than protection conferred by vaccination. This laboratory experience supports our opinion that a considerable part of the apparent freedom from infection and amelioration and shortening of the disease among members of the experimental group, were due to vaccination.

DISCUSSION

We would have preferred a standard type of vaccine, but under the stated circumstances and limiting conditions,

the oxidized vaccine was the only one found suitable for mass trials. The relatively low serum agglutinin titers indicate an antigenicity lower than that desired. We are unable to explain the observation that revaccination provoked titers which averaged lower and showed a lower extreme range than those induced by initial vaccination. Since revaccinated persons were better protected it is inferred that agglutinin titers bear little relation to the degree of protection. Decrease in antigenicity of vaccine due to oxidation was demonstrated by measuring agglutinin titers in rabbit sera after equivalent amounts of formalinized, heat killed, and oxidized suspensions were injected intravenously. Simultaneous injections and bleedings resulted in the titers shown in Table 7.

TABLE 7

Serum dilutions		1:10	20	40	80	160	320	640	1,280	2,560
Made by	Formalinized	4	4	4	4	4	4	4	4	3
	Heat killed	4	4	4	4	4	4	4	4	2
	Oxidized	4	4	4	4	4	4	2	0	0

Rabit serum agglutinins produced by equivalent amounts of the three antigens. All titers were measured with standard formalinized antigen.

The agglutinability of oxidized bacteria was not altered, since sera from many animals always agglutinated such suspensions to titers found for formalinized suspensions. Furthermore, equivalent agglutinin absorption was demonstrated for oxidized and formalinized bacteria in equal amounts. Oxidation impairs antigenicity without altering the surface antigenic components which unite with antibody *in vitro*, indicating that surface components are not major factors in producing protection.

Living avirulent vaccines have not been tried.

Since many efforts by ourselves and by others to demonstrate protective antibody in sera from patients at various stages of recovery from disease invariably resulted in failure, when mice and highly virulent cultures were used, we did not try to measure protective antibody in sera from vaccinated persons. In controlled studies on the highly susceptible rabbit Downs demonstrated that formalinized vaccine induced a high degree of resistance and considerable protection against infective doses fatal to unvaccinated animals.[5] The survival periods of her control rabbits indicate challenge strains of less than maximal virulence. Unpublished experiments from several laboratories, including ours, are in agreement that vaccine prophylaxis of laboratory rodents consistently fails to protect against a challenge m.l.d. of any strain of maximal virulence. Under these conditions vaccinated animals occasionally die sooner than normal ones. We have not been able to protect rabbits with oxidized vaccine, regardless of the interval between vaccination and infection, if a strain of maximal virulence was used for the challenge dose.

With this infection it is likewise impossible to demonstrate passive protection by hyperimmune animal sera in laboratory rodents against infecting strains of maximal virulence. Our long unpublished experience is in complete agreement with that recorded by others.[6] The administration of serum from a long and heavily vaccinated uninfected person to a patient in the acute stage of tularemia resulted in a prompt and persisting lowering of temperature,

amelioration of symptoms, and reduction in size of buboes, but the serum had no protective value for guinea pigs. Rodents are unsuitable animals for either purpose. Many difficulties encountered in immunologic studies on experimental tularemia in rodents closely resemble those observed in experimental plague. In the absence of a suitable test host we are at present forced to rely upon results of studies on man for evidences of vaccine protection and of potency of therapeutic antisera.

Since the duration of protection probably seldom exceeds 1 year for the majority of those vaccinated, and is apparently less for the remainder, revaccination is advised at least annually when exposure is seasonal. If exposure is anticipated throughout a considerable part of the year, as in laboratory work, wild life investigations, or a military establishment in our western states where fly-borne or tick-borne disease commonly occurs throughout the summer, revaccination with small doses is advisable every 3 or 4 months during the period of exposure.

We appreciate that this study is incomplete, that the experimental group is small, and the observation period short. Our original plan to continue work until a large number of vaccinated individuals could be followed for many years, with extension and expansion of related laboratory studies, has had to be modified. Various factors associated with our entry into war have already operated to disperse the group, to alter exposure risks, and to modify otherwise conditions of study. The promising results obtained, and the possibility that vaccination might be advisable for men concentrated in certain regions during the war, prompt us to report a summary at the present time.

SUMMARY

The experience with 2,145 exposed, susceptible persons indicated that a useful degree of protection was conferred by annual vaccination.

More frequent vaccination of exposed laboratory personnel gave more convincing evidence of a high degree of protection.

The vaccine had certain stated disadvantages partly outweighed by the following practical advantages: ease and safety of subcutaneous administration without provocation of severe reactions or of sterile abscesses, short administration period, and reliable reproducibility on small scale production.

Individuals who were not completely protected experienced significant favorable modifications in the course of disease.

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The Relation of Childhood Infection to the Development of Tuberculosis in Early Adult Life

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IT is well known that the mortality from pulmonary tuberculosis is extremely low between the ages of 5 and 14 years. The great majority of tuberculous infections and lesions acquired during childhood retrogress without treatment, and reinfection-type pulmonary tuberculosis is rarely seen, even though a considerable portion of tuberculous children are presumably exposed to reinfection. The appearance of reinfection-type pulmonary infiltrations becomes more frequent in adolescence; it is probable that this change in the character of the tuberculous process is determined in large measure by age-linked factors.[1]

The belief that the seemingly benign infections of childhood are responsible for much of the morbidity and mortality from tuberculosis which occur in adult life is still widely held, as evidenced in recent publications.[2-7] Direct evidence for this belief is, however, meager. A number of studies have been reported in which the frequency of tuberculosis has been compared in persons who had had a positive tuberculin reaction and persons showing a negative reaction during childhood. Such studies show a higher incidence of tuberculosis in the group infected during childhood. The inference that the higher morbidity is the result of the childhood infection would be valid, however, only in so far as the risk of infection in adult life is equal in the two groups. Thus, individuals remaining tuberculin-negative cannot be considered to have undergone a risk of developing tuberculosis. The assumption that subsequent exposure to sputum-positive tuberculosis is equally common among persons having household contact during childhood and those without childhood contact is demonstrably incorrect. In the present study, children having household contact with sputum-positive tuberculosis were five times more likely to have similar intimate contact during adult life than infected children not in household contact. In the case of tuberculin-negative children, there is a presumption that they reside in households free of tuberculosis and in areas where casual infection is uncommon, and where it is therefore relatively unlikely that they will have household contact in adult life. Whether the morbidity among persons who had been infected in childhood is the result of initial or subsequent exposure can be determined only if accurate information is available concerning the presence of household contact during adult life as well as in childhood. Such information has been obtained in families under supervision of the Henry Phipps Institute. The present report is a considera-

tion of the influence of household contact during adult life upon persons who had been infected during childhood; such an analysis should demonstrate the relative importance in the pathogenesis of adult tuberculosis of the initial infection occurring in childhood and subsequent exogenous infection resulting from household exposure during adult life.

MATERIAL AND METHOD OF STUDY

The records have been studied of families whose supervision at the Henry Phipps Institute began between 1924 and 1932. A detailed description of the medical and nursing supervision given these families has been made by Opie and McPhedran.[8] It is worthy of emphasis that home visiting by staff nurses has been equally intensive and persistent in families with sputum-positive tuberculosis, families with sputum-negative tuberculosis, and a control group of families free of tuberculosis. In no instance has family care been voluntarily discontinued; observation has been maintained except when families moved, leaving no trace. A recent interview with members of these families was obtained in a remarkably high proportion of cases. Recent roentgenological examination was obtained in a large percentage of the individuals observed but, in order to obtain results comparable to other studies of this type, the present report deals with the incidence of clinically manifest tuberculosis rather than with the incidence of roentgenologically demonstrable lesions.

The limit between childhood and adolescence has been arbitrarily placed between the ages of 13 and 14 years; it has been required for inclusion in the present series that the person before the age of 14 years have acquired naturally a positive reaction to 0.01 or 1.0 mg. of Old Tuberculin and have had a chest roentgenogram which was either negative or revealed primary-type lesions only. Among the children fulfilling these requirements there were 982 concerning whose health status in adolescence and adult life information was available. The duration of observation after the age of 13 years extended from 1 to 17 years. The total number of person-years of observation during adolescence and adult life was 7,530. The mean duration of observation after childhood was 7.9 years for white males, 8.0 years for white females, 6.2 years for colored males, and 6.8 years for colored females.

Three white and 3 colored patients who had developed clinically manifest reinfection-type tuberculosis before the age of 14 years have been excluded, since the purpose of the present study is to determine the fate of infected persons who are apparently healthy upon entering adolescence. For the same reason, it has appeared desirable to exclude also persons who had asymptomatic reinfection-type infiltrations prior to the age of 14 years. This exclusion is practicable, since in the case of the 36 persons included in the study who developed manifest tuberculosis in adult life, it was demonstrable in all but 2 instances that reinfection-type disease was not present at the age of 13. The likelihood that these 2 persons had asymptomatic infiltrations during childhood is small. It should be emphasized that, although asymptomatic reinfection-type infiltrations appearing in childhood account for only a relatively insignificant portion of adult morbidity from tuberculosis, such lesions have serious clinical consequences as brought out by Sweany.[9] Six white girls, 1 white boy, and 3 colored girls were observed to have asymptomatic reinfection-type lesions between the ages of 11 and 13 years, and 8 of these individuals developed clinically manifest tuberculosis in adolescence. Inclusion in this study of persons having reinfection-type disease during childhood would result in a

somewhat higher morbidity rate for the group as a whole. The other findings reported are not substantially altered, however, as shown by a test analysis including these cases.

In recording the presence within the household of persons with positive sputum or of fatal cases of tuberculosis with history of cough and expectoration, the records have been compiled on an individual basis; that is, one member of a family born in 1920 and exposed to a sputum-positive grandfather dying in 1923 is recorded as having been in contact, while another member of the family born in 1925 is included in the group not exposed to positive sputum. The group of families in which sputum-positive contact was not present include families whose tuberculous members had sputum-negative (in large part asymptomatic) pulmonary disease or extrapulmonary tuberculosis, as well as families in which no member had tuberculosis. These groups have been combined for the purposes of the present study, since only slight differences in incidence of tuberculosis during adolescence and adult life were noted among members of these various groups.

Because of the importance of the age factor, the morbidity during adolescence and adult life has been calculated on an age-specific basis. The number of individuals under observation at each age was obtained by counting each person as many years as he was years under observation after the age of 13. Thus a person followed from the age of 6 to 18 is included in the totals for ages 14, 15, 16, 17, and 18.

The social and economic changes occurring in these families during the long period of observation are of interest. Dramatic changes in financial status were infrequent. Despite the economic depression of the last decade, there appeared to be improvement in the circumstances of a considerable portion of the families. In another large group of families, however, in part presumably as the result of chronic illness in the household, the social and economic status deteriorated.

MORBIDITY AND MORTALITY DURING ADOLESCENCE AND EARLY ADULT LIFE—INFLUENCE OF AGE, COLOR AND SEX

Among the 982 persons observed, clinically manifest tuberculosis developed in 36 (Figure 1). These included among white males, 5 cases of pulmonary tuberculosis and 1 case of tuberculous cervical adenitis; among white females, 13 cases of pulmonary tuberculosis and 1 case of pleurisy with effusion; among colored males, 2 cases of pulmonary tuberculosis and 1 case of tuberculous osteitis; among colored females, 8 cases of pulmonary tuberculosis, 2 cases of pleurisy with effusion, 1 case of tuberculous osteitis, and 1 case of tuberculous meningitis. The disease was fatal in 14 instances.

Although the morbidity rate at various ages fluctuated considerably, Table 1 shows that the mean annual attack rate for the ages 14 to 21 years closely approximated the rate for the ages of 22 to 30 years, both in the white and colored groups. It is therefore permissible in subsequent calculations to consider that the risk of developing tuberculosis is the same in a year of observation at the age of 24 as in a year of observation at the age of 14. The cause of the static morbidity rate noted in this study will be discussed later under "Comment."

The annual morbidity rate was three to four times greater among Negroes (1.21 per cent) than among whites (0.33 per cent).

The morbidity among females at the ages studied was considerably higher than among males. The rate in white females (0.44 per cent) was twice that of white males (0.21 per cent), and the rate in colored females (1.69 per cent) was three times that of colored males

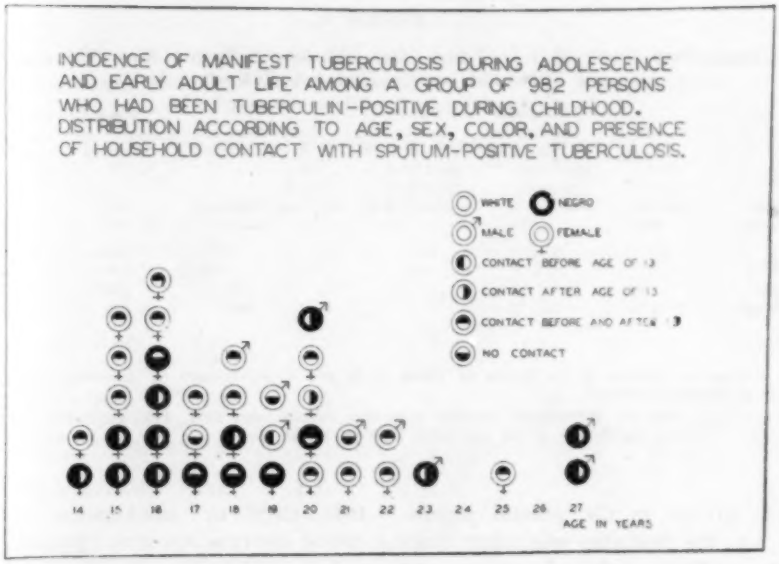
INCIDENCE OF MANIFEST TUBERCULOSIS DURING ADOLESCENCE AND EARLY ADULT LIFE AMONG A GROUP OF 982 PERSONS WHO HAD BEEN TUBERCULIN-POSITIVE DURING CHILDHOOD. DISTRIBUTION ACCORDING TO AGE, SEX, COLOR, AND PRESENCE OF HOUSEHOLD CONTACT WITH SPUTUM-POSITIVE TUBERCULOSIS.
WHITE
NEGRO
MALE
FEMALE
CONTACT BEFORE AGE OF 13
CONTACT AFTER AGE OF 13
CONTACT BEFORE AND AFTER AGE OF 13
NO CONTACT
14 15 16 17 18 19 20 21 22 23 24 25 26 27
AGE IN YEARS

FIGURE 1

(0.54 per cent). The morbidity among females was largely concentrated in the adolescent years, while that among males was concentrated in the later years. A high morbidity in early adolescence was particularly marked among colored females. These sex differences in incidence, which are in accord with familiar observations on the general population, appeared to be independent of the time of occurrence of household contact with sputum-positive tuberculosis, and may properly be considered to be governed by constitutional factors.

Although the number of deaths was small, the rates paralleled those of

TABLE 1

Age-Specific Morbidity after the Age of 13 Years among Individuals Who Had Been Tuberculin-positive in Childhood

Age in Years →	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*
White																	
Number at risk	773	727	682	661	581	520	467	405	342	274	222	166	114	76	46	26	11
Number developing tuberculosis	1	3	2	2	2	2	2	2	2	0	0	1	0	1	0	0	0
Attack rate (per cent)				0.33									0.31				
Negro																	
Number at risk	209	191	180	155	132	112	94	69	53	41	29	20	19	11	8	5	0
Number developing tuberculosis	1	2	4	1	2	1	3	0	0	1	0	0	0	1	0	0	0
Attack rate (per cent)				1.2									1.1				

TABLE 2

Tuberculosis Death Rate in Early Adult Life among Persons Who Had Been Tuberculin-positive During Childhood

	Number of Persons	Number Developing Tuberculosis	Number of Deaths from Tuberculosis	Total Person-Years of Observation*	Death Rate per 100,000	
					Observed	Expected†
White						
Male	365	6	2	2,889	70	32
Female	408	14	3	3,279	92	47
Negro						
Male	90	3	2	559	360	220
Female	119	13	7	803	870	319

* Includes, in contrast to the figures in Tables 1, 3, and 4, person-years of observation after clinical tuberculosis became manifest

† Calculated from the Philadelphia mortality experience for the years 1932, 1933, and 1934, adjusted to correspond to the age distribution of the population observed in the study

similar groups in the general population; i.e., the mortality was many times higher in Negroes than in whites, and was higher in young adult females than in young males. In each group the rate was roughly twice the rate expected in persons of corresponding age in the general population of Philadelphia (Table 2).

INFLUENCE OF HOUSEHOLD CONTACT WITH SPUTUM-POSITIVE TUBERCULOSIS

It is evident from the data presented in Table 3 and Figure 2 that a markedly higher morbidity occurred among persons intimately exposed to sputum-positive tuberculosis during adolescence than in those with no record of household exposure. The rate was equally

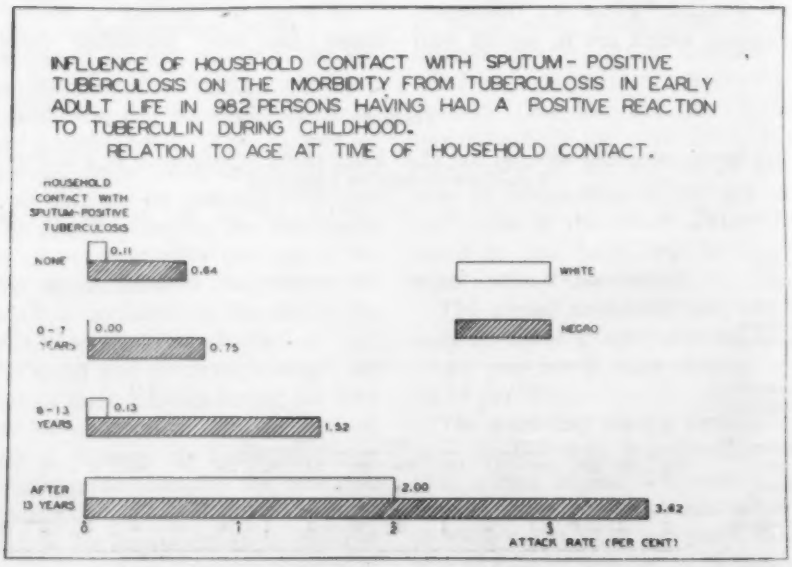

FIGURE 2

TABLE 3

Influence of Household Contact with Sputum-positive Tuberculosis upon the Incidence of Clinically Manifest Tuberculosis among Young Adults Who Had Been Tuberculin-positive During Childhood

Relation to Age at Time of Household Contact

	None	0–7 Years of Age Only	8–13 Years of Age but Not Thereafter*	Before and After Age of 13 Years	14–30 Years of Age Only	Total
White						
Number of persons	354	174	184	83	10	773†
Person-years at risk	2,743	1,045	1,524	705	47	6,064
Number developing tuberculosis	3	0	2	14	1	20
Attack rate (per cent)	0.11	..	0.13	2.00		0.33
Negro						
Number of persons	90	35	81	19	7	209†
Person-years at risk	622	134	460	87	23	1,328
Number developing tuberculosis	4	1	7	2	2	16
Attack rate (per cent)	0.54	0.75	1.52	3.62		1.21

* Including children who had had prior contact

† Omitting reduplications resulting from inclusion of persons exposed in adult life in the groups without adult contact, prior to the onset of adult exposure

low among white persons not having household contact during adolescence, whether or not they had been exposed during childhood. A higher rate was observed among colored persons who had childhood contact than in those without a record of household contact; this was particularly notable in the case of persons last having contact in the later years of childhood, and is presumably correlated with the marked susceptibility of colored females in the early years of adolescence.

The differences in morbidity between persons having household contact during adult life and persons not having such contact are, on application of the chi-square test, significant in the case of the colored group and highly significant in the case of the white group.

Worthy of note also is the correlation between household contact during childhood, the prevalence of primary-type tuberculosis, and the occurrence of household contact in adult life. Household contact during childhood was noted in 418 white children; of these 83 (19.8 per cent) had continuance or recurrence of household contact in later life. Among 355 white children who did not have childhood contact, there were 10 (2.8 per cent) who had household contact in adolescence or adult life. Similarly, of 118 colored children having household contact, 19 (16.1 per cent) had similar contact in adult life; and among 91 colored persons not having contact during childhood, 7 (7.7 per cent) had household contact with sputum-positive tuberculosis in later life. It is evident that tuberculosis is more truly a "household disease" among whites than among Negroes.

Among the 418 white persons having household contact with sputum-positive tuberculosis during childhood, 165 (39.5 per cent) had roentgenological evidence of active or calcified primary-type pulmonary lesions, while such lesions were found in only 59 (16.6 per cent) of the 355 persons who did not have contact in childhood. The corresponding percentages among colored persons were 39.8 and 18.7.

RELATION TO ROENTGENOLOGICALLY DEMONSTRABLE PRIMARY-TYPE TUBERCULOSIS

Pope, Zacks and Sartwell [10] found a significantly higher morbidity in persons with roentgenological evidence of calcified childhood-type tuberculosis. In the present study, a higher morbidity rate was observed in white persons with calcified lesions (0.48 per cent) than in those with negative films (0.26 per cent), but the morbidity rate was 0.96 per cent among colored persons with primary-type lesions and 1.32 per cent in those with negative films. That this difference between whites and Negroes is not fortuitous, but may be due to a group difference in epidemiological behavior, is suggested by the observation that calcified primary-type lesions are much more often seen in association with clinical tuberculosis among white adults than among colored adults.[11]

The greater morbidity observed in white persons with calcified lesions may be due to the facts that calcified lesions occur more frequently in children having household exposure to sputum-positive tuberculosis and that persons having had household contact during childhood are more likely to do so subsequently. Calculation of morbidity rates among both white and colored persons not having known household contact after the age of 13 years shows a slightly higher incidence among those having calcified lesions (Table 4). This difference may be the result of chance, as is suggested by the fact that the difference is not significant on statistical analysis, or it may actually represent a slightly greater risk resulting from endogenous breakdown.

EFFECT OF PREVENTORIUM CARE

Friedman and Billings [12] have reported a study of the incidence of clinically manifest reinfection-type tuberculosis among a group of persons followed after discharge from the Prendergast Preventorium. The 409 children studied had a mean age of 8 years on admission to the preventorium and a mean age of 21 years at the end of the follow-up period: the total number of person-years of observation may be calculated to be 5,318. In order to compare properly these data with those in the study of families at the Henry Phipps Institute, it is necessary to restrict the observation period to the interval after the age of 13 years. It may be calculated that 3,262 person-years of observation occurred after this

TABLE 4

Morbidity from Tuberculosis among Young Adults Who Had Been Tuberculin-positive During Childhood. Relation to Presence of Roentgenologically Demonstrable Primary-type Tuberculosis in Childhood (excluding person-years of observation after onset of household contact in adult life)

	Number of Persons	*Person-years of Observation after Age of 13 (Prior to Adult Contact)*	*Number Developing Tuberculosis after Age of 13 Years*	*Attack Rate (per cent)*
White				
Negative film	507	3,692	3	0.08*
Active or healed primary-type lesion	205	1,620	2	0.12*
Negro				
Negative film	144	856	8	0.92*
Active or healed primary-type lesion	62	360	4	1.11*

* Comparison of the number of cases observed in persons with negative films and the number expected on the basis of the morbidity rate in persons with primary-type lesions reveals that these differences are not statistically significant

age. All 9 of the cases which developed appeared after the age of 13 years,[13] giving a mean annual morbidity rate in adolescence of 0.28 per cent.

The number of children in the present study who received preventorium care was small. Twenty white children, or 2.6 per cent of the total, were in preventoria for intervals of more than 3 months. It is interesting, therefore, that the incidence of reinfection-type tuberculosis during adolescence in the entire group of white persons (0.33 per cent) is not appreciably greater than in the group of similar composition who had received care at the Prendergast Preventorium.

COMMENT

An annual morbidity from tuberculosis during adolescence and early adult life of 0.33 per cent and a mortality rate approximately twice that of the general population of Philadelphia may appear to be surprisingly low when it is considered that the population studied had been infected during childhood, was an indigent or semi-indigent one, living in a congested urban area, observed in large part during a period of severe economic depression, and further handicapped in a majority of instances by the presence of wage earners or other adults ill with the chronic disease of tuberculosis. Possibly the cause of this low rate lies in the relatively small number of persons who had recurrence of household contact with sputum-positive tuberculosis after childhood. It is an interesting question to what extent these findings represent the natural history of the disease under present-day conditions, or to what extent they have been influenced by the therapeutic and educational efforts made by the clinic physicians and public health nurses. Thus the fact that the same morbidity was observed in persons having preventorium care and in those not having such treatment, may be construed as indicating that preventorium care has no effect on the morbidity in adult life or, on the other hand, may be interpreted as indicating that the educational efforts of a clinic of the type of the Henry Phipps Institute are as effective as preventorium treatment in reducing the morbidity from tuberculosis in later life. It should be recognized as a limitation of this type of epidemiological study that the mere fact that a family is urged to have examinations may alter its subsequent behavior and may lessen the spread of disease.

The mean annual morbidity observed in this study is, as has been pointed out, practically identical with the rate (0.28 per cent) which prevailed during adolescence in tuberculin-positive persons discharged from the Prendergast Preventorium.[12] A similar annual morbidity rate, ranging from 0.2 per cent at the age of 14 years to 0.4 per cent at the age of 18 years, was observed in the large series of observations on tuberculin-positive Massachusetts school children reported by Pope, Sartwell and Zacks.[10] It should be pointed out that the rates found in these three investigations are not comparable to the rate reported by Ch'iu, Myers, and Stewart,[3] for in the latter study a significant proportion of the morbidity and mortality observed occurred during childhood. Disease and deaths occurring before the age of 14 years have been excluded from the present study, which is concerned rather with the likelihood of subsequent development of tuberculosis in individuals who, previously infected, enter adolescence in apparent good health.

In neither of the Massachusetts studies was consideration given to the influence of household contact during adolescence. In the families studied at the Henry Phipps Institute it has been possible to obtain accurate information concerning the presence or absence of sputum-positive tuberculosis. Analysis

on the basis of this information indicates that the annual morbidity rate of approximately 0.3 per cent found in these studies represents a composite of a low rate occurring among those not exposed during adolescence and a high rate occurring among those having onset, continuance, or recurrence of household contact during adolescence. The extremely low rate observed in white persons not exposed to household contact in adult life is especially remarkable in view of the high risk of casual infection in the district of Philadelphia served by the Henry Phipps Institute. It seems reasonable to believe that the previous tuberculous infection afforded an increased resistance sufficient to protect against casual infection, although it is evident that this protective effect was obliterated when household contact with sputum-positive tuberculosis was present.

It is noteworthy that no rise in morbidity with increasing age was noted in the present study, in contradistinction to the generally recognized fact that the incidence of tuberculosis rises throughout adolescence and early adult life. This rise is considerably more rapid than the increment of infection during this period of life and must be considered the result in large part of age-linked alterations in resistance. The diminution in resistance during early adult life is masked in the present study by the fact that only persons infected during childhood have been included. In the general population, on the other hand, there is a constant accession of persons infected for the first time at the ages of 14, 15, 16, etc., and it is reasonable to assume that these newly infected persons account for a portion of the morbidity from tuberculosis in the latter years of adolescence and in adult life. In the general population, moreover, while the percentage of children having household contact is far smaller than in the group under study, there is no such marked decline in occurrence of household contact during adult life as has been observed in the present study. Thus, in the general population, the likelihood of household exposure at the age of 20 years is less than at the age of 12 years only to the degree that the prevalence of open tuberculosis in the community has declined in the 8 year interval. The present study is comprised largely of members of tuberculous families: 54.6 per cent had contact with sputum-positive tuberculosis in childhood while only 12.1 per cent had contact in adolescence, reflecting the frequent termination of exposure either by death or as the result of treatment. It should be emphasized that although household contact in adult life was much more frequent among the members of families under study than it is in the general population, nevertheless it is true that the risk of household exposure for the group under study declined sharply in early adult life, while in the general population the risk declines only slightly. As a result of the sharp decline in occurrence of household contact in the group under study the excess of morbidity over the general population was great in early adolescence, and smaller in subsequent years, the net result being a static rate. In the general population, on the other hand, the almost constant risk of infection during adolescence to persons previously tuberculin-positive as well as tuberculin-negative, associated with a decline in resistance during these years, results in an ascending incidence of tuberculosis.

Pulmonary tuberculosis developing during adolescence and early adult life in persons who had not had household contact after childhood, may be endogenous, i.e., due to progression of the original infection, or exogenous, i.e., the result of fresh infection acquired outside the household. That both possibilities may occur [2] cannot be doubted,

but it is a question which is the more frequent. A striking example of the fact that not all tuberculosis developing in the absence of known household contact can be considered endogenous is afforded by the case of J. G., an Italian male. He was first examined in 1928 at the age of 13 years because of the diagnosis of asymptomatic minimal tuberculosis in his father. The tuberculin reaction was 2+ to 0.1 mg. OT, and x-ray examination of the chest was negative. In 1929 the tuberculin reaction was 1+ to 0.1 mg. OT, in 1932 the reaction was 3+ to 1.0 mg., and in 1933 there was no reaction to 1.0 mg. In January, 1935, there was no reaction to 0.005 mg. Purified Protein Derivative and x-ray examination of the chest remained negative. In March, 1936, at the age of 21 years, respiratory symptoms developed. The tuberculin reaction was 2+ to 0.00002 mg. PPD and x-ray examination showed moderately advanced tuberculosis. The sputum was positive.

Despite treatment, the patient died 18 months later. No other member of the household had sputum-positive tuberculosis, although a number of siblings developed or re-developed tuberculin sensitivity in 1937 and one became ill with pleurisy with effusion.

That similar reversion of the tuberculin reaction from positive to negative is not uncommonly observed when the tuberculin test is frequently repeated, has been shown by Dahlstrom.[14]

It has been pointed out[15] that in many of the studies demonstrating a higher incidence of tuberculosis in members of families containing a sputum-positive patient, the multiple family incidence might be due not to greater opportunity for infection but to a hereditary deficiency of resistance. The demonstration in the present study that the more recent the contact the greater the morbidity, suggests that multiple family incidence is due more to the factor of infection than to genotypic factors.

The data reported in the present study give no information as to the relative risk of morbidity in adult life of persons infected in childhood and those uninfected. That a somewhat greater morbidity under equal conditions of exposure occurs among adults who are previously uninfected is demonstrated by most studies of student nurses and medical students,[16] and patients in mental hospitals.[17, 18] It is clear, on the other hand, that under the ordinary circumstances of life, infected and non-infected children do not undergo the same risk of exposure in adult life. No simple statement, therefore, can describe the risk of tuberculosis experienced by persons infected in childhood. A comprehensive statement must include the following considerations:

1. Morbidity and mortality from tuberculosis before adolescence, high in infancy, and very low during the remaining years of childhood, are by no means negligible, and of course occur only among those infected during childhood.

2. The survivors, i.e., those who enter adolescence with calcified lesions or without roentgenologically demonstrable lesions, exhibit under similar conditions of exposure a somewhat greater resistance than those previously uninfected.

3. On the other hand, persons having household exposure or having otherwise been infected during childhood undergo a certain risk of endogenous breakdown, and are under ordinary circumstances more likely to have exposure to infection during adolescence and adult life.

4. The greatest risk of tuberculosis in adolescence and adult life is experienced by those having recent household contact with sputum-positive tuberculosis, whether or not they were infected during childhood.

The person infected during childhood thus is at greater risk even though partially protected. He is better able to withstand casual infections; yet the very fact of having been infected in childhood carries with it a greater likelihood of encountering in adult life

household contact with sputum-positive tuberculosis. And against this intimate exposure, the increased resistance conferred by previous infection does not afford protection.

SUMMARY

1. Observation during adolescence and early adult life was given 982 individuals who had had a positive tuberculin reaction during childhood. Accurate information concerning the occurrence of household contact with sputum-positive tuberculosis was available.

2. The mean annual morbidity rate was 0.33 per cent in the white group, and 1.21 per cent in the colored group.

3. The mean annual morbidity rate was 0.21 per cent in white males as compared to 0.44 per cent in white females, and 0.54 per cent in colored males as compared to 1.69 per cent in colored females.

4. The mean annual morbidity rate was 0.1 per cent in white persons not having household contact after childhood as compared to 2.0 per cent in white persons having household exposure during adolescence and adult life; the corresponding rates for the colored group were 0.98 per cent and 3.62 per cent.

5. The morbidity rate in persons who had roentgenological evidence of primary-type tuberculosis was not, in the absence of household contact in adult life, significantly higher than the rate in persons with negative films.

6. The rate of 0.33 per cent observed in white persons, relatively few of whom had had preventorium care, was not appreciably higher than the rate calculated from comparable data reported in persons discharged from preventoria.

CONCLUSIONS

1. Morbidity from tuberculosis in adolescence and early adult life is more frequently the result of household exposure after childhood than before, indicating that in early adult life exogenous infection is of greater importance than endogenous breakdown of lesions acquired in childhood.

2. Case finding efforts in adolescence and early adult life should be directed toward persons having recent household contact with sputum-positive tuberculosis. Prolonged supervision of persons exposed during childhood is not indicated unless household exposure is continued or recurs in adult life.

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Public Health and Medical Relationships in Industrial Health*

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THE immediate necessity of this war is production of great amounts of military supplies. In fact, the length and outcome of this conflict are dependent on the rapidity with which our united armies can be equipped with tanks, airplanes, guns, munitions, and other accouterment, and transported to every continent of the world. We have seen the effectiveness of coördinated utilization of all types of mechanization in warfare. Just as they have been coördinated, so must the forces of production be coördinated. In a general sense production rests on only two factors—man power and materials. Even the flow of materials is dependent on man power. There the simplicity of the matter stops, consideration of man power is complex.

Its capacity to produce is affected by a multiplicity of influences—not the least of which is its physical well-being or health—as individuals and as a group. The importance of the health of the worker is not generally comprehended, despite the seemingly great amount of emphasis which has been placed on it.

All those working or actively interested in health have the grave responsibility of bringing about such changes as will result in maximum utilization of man power.

The early development of medicine or health work was directed toward curing the sick individual. With the discovery of the specific cause of some diseases, immunization or prevention became effective. When employers were made financially responsible for injuries to workmen, prevention of accidents and occupational diseases became the wisest course. The results were material and easily visualized. But preventive industrial procedures in their broad application apparently do not lie within the conception of many industrialists and health workers. It is preventive industrial health that is so vital today. The term industrial health means all phases of industrial medical services — environmental sanitation, treatment of injuries, and, most important of all, prevention. Treatment of the sick or injured individual is of receding importance in this enlarging field. The incapacitated worker is to be restored as soon as possible, but more significant is keeping the well worker on the job and instituting measures which will improve those below par in order that they will not lose time.

War is impersonal, subjugating humanitarian interests to a secondary rôle. Though it is not entirely desirable to consider industrial health in the same manner, it can be done. Without doubt, it is the type of treatment of the subject most readily grasped. It has been stated that in 1941 there were 400 million man days lost in industry from physical disability—that this lost man power was sufficient to build 20,000

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bombers or a line of tanks 250 miles long.

Considering it from the dollars and cents angle—the loss to the wage earners alone at an arbitrary average wage of $5 per day was 2 billion dollars.

The loss to the employer is greater. One authority [1] has stated that the direct loss from non-occupational illness due to disturbances of production is one and one-half times the wage of the absent employee. This means the direct loss to industry was 3 billion dollars. Figures issued by one manufacturer [2] reveal that a 50 per cent reduction of absenteeism would save them $70 per worker. Thus a proper preventive medical program would save about 3½ billion dollars in the country as a whole. Yet the United States Treasury Department estimates the net profit of industry in 1941 was 8 billion dollars.

Obviously, if medical groups and management continue on the old plan of treatment only, there will be no reduction of this loss. Rather, the trend so far is upward. In one state, the accident frequency has increased over 100 per cent in the last year. The tension, longer hours of work, and rising costs of living are among the factors which have caused a 10 per cent increase in absenteeism in defense plants. If this condition is not rectified and the upward trend of accidents and illnesses continues—as it surely will as production becomes more intensified—not only will the economic loss increase, but it will be a greater handicap to the production of materials we so sorely need.

Management has learned to include these losses in the cost of production, which is reflected in the price of the product. Unfortunately, the wage earner is unable to make such an adjustment during sickness and the compensation he receives from occupational injury is a poor substitute for good health and a full pay envelope. As a result, a vicious cycle is established—sickness stops his income, which lowers this family's standard of living. This not only lowers his efficiency as a worker but is manifested in the well-being of the entire family. It is axiomatic that the economic state has a direct bearing on general health.

The implication is obvious—preventive procedures if properly carried out will help improve the whole social structure.

It would seem that a program of such potential merit would progress rapidly. Unfortunately, interest in industrial health has only just begun and in a desultory manner up until the inception of the defense program. The attitude toward it now is the same as existed toward vaccination, immunization, and sanitation in earlier days. It is an attitude resulting from incomprehension of the meaning and value of preventive procedures in industrial health. No group, professional or otherwise, is entirely blameless. In relation to industry—the practising medical profession thinks in terms of traumatic surgery; nurses consider it in the light of first aid; except for industrial hygiene personnel, health departments think only of sanitation or cross-connections; managements' conception is that of accidents and insurance premiums; and labor—the real beneficiary—greets it with resistance or a feeling of persecution.

For many years there have been a few proponents of the preventive aspects of industrial health, but latterly with the realization of its proper position, new forces have been added to its development, and its scope is being defined. It has suddenly attained the dignity of a specialty.

In recognition of its reciprocal importance to the future of the medical profession, the Council on Industrial

Health of the American Medical Association was organized late in 1937. It has set down and promulgated the objectives and procedures of industrial health as a whole. An "Outline of Procedure for Physicians in Industry" was published by the Council in the *Journal of the American Medical Association*, March 14, 1942. It embodies the general principles and functions of industrial medical service. It states that—

> . . . the purpose of medicine in industry is to promote the health and physical well-being of industrial employees, these objectives to be accomplished by:
>
> 1. Prevention of disease or injury in industry by establishing proper medical supervision over industrial materials, processes, environment, and workers.
>
> 2. Health conservation of workers through physical supervision and education.
>
> 3. Medical and surgical care to restore health and earning capacity as promptly as possible following industrial accident or disease.

There is nothing new in these statements, but they represent something which both physician and employer can catch hold of. Heretofore, it has been believed that these principles apply only to large institutions. Even so, many have not incorporated them. More important, the numerically superior small plants can and should have an equally complete program of industrial medical service. "The quality of medical service in industry should be uniform—the quantity only varying with the size of the plant." The first argument presented against such a thesis is economic—small industry cannot afford to enter into such a plan. There has not been enough evidence, by surveys or otherwise, to substantiate the belief that this type of service properly carried out is economically unsound. In the large plant a full-time physician performs examinations, treats injuries, and perhaps supervises plant hygiene and carries out health education. New experiences are demonstrating that the cost should not be much greater if the required amount of service—commensurate with the size of the plant—is secured on an hourly basis from a private physician.

THE PHYSICIAN

Ideally, industrial health requires putting into operation in every plant adequate medical supervision, satisfactory to those who receive and those who supply the service. The real obstacle to this type of service for small plants—and the most difficult to overcome—is the lack of recognition by industry and the medical profession of the efficacy of preventive procedures. This does not imply that all large plants have an adequate medical service—quite the contrary. Many that would be justified by any standard in having a full-time medical service have only a physician on call in event of accidents, or one who comes into the plant for an hour or so and confines his attention to wrapping fingers or otherwise treating injuries. Ability to extend preventive services in these plants depends upon the vision and improved training for all physicians. The physician will not hesitate to relinquish the old for the new practices if their real significance is brought forcefully to his attention.

Returning again to the small plants—those too small to warrant full-time medical service. Those with less than 500 workers comprise over 90 per cent of the industrial establishments. It was stated that all of them could and should have an adequate service. The important thing is an appreciation on the part of the physician of the importance of prevention. He must realize also the relationship of working conditions and the health of the workmen. He need not be a trained industrial hygienist but he should know what, if any, operations or exposures may be present in the plant which may cause illness and what the

signs of such illness may be. To apply this knowledge he must be intimately aware of the physical details of the industry and the requirements of each process therein. In turn this knowledge enters into the decision as to the type of work a man is able to perform. It is fundamental to preëmployment and periodic physical examinations, which are just as essential whether dealing with 100 men or 1,000. The physician who serves industry must be neutral, being neither unduly prone to ascribe to working environment conditions not readily accounted for, nor failing to recognize the evidence of occupational influence. It is an understanding of industrial etiology.

All studies to date indicate that industrial conditions cause only 10 per cent of the time lost from work because of physical disability, the remaining 90 per cent resulting from illness affecting the general population. Consequently the greatest loss to the worker, industry, and society as a whole is from this source. There are certain known facts having a bearing in this matter.

It was stated earlier that a manufacturer could save $70 per employee by a 50 per cent reduction in absenteeism. Now it has been found in numerous plants that 12 to 15 per cent of the employees cause 55 to 60 per cent of the time lost by sickness.[3] In other words, this small group are sickness prone and should be the choice for concerted attention along prevention lines. If their record could be made to approach that of the remaining more healthy group it would be a notable achievement. And that is exactly what has been done in some plants. A study of their records indicated that some needed specific remedial work, and that all could be improved by general measures. By a plan of education, dwelling on nutrition and health measures and adjustments in relation to working requirements and shifts, the incidence of absenteeism in this heretofore sickness prone group was reduced to the general level. Not only that—it was found that the entire plant population benefited and a considerable amount was carried into the homes by the workers.

INDUSTRIAL MEDICAL SERVICE

There are plans by which the small plant may organize a medical service. The physician in practice may call at the plant at stated hours and perform as much of his work as possible. This affords him the opportunity of becoming familiar to the employees and the conditions under which they work. Health lectures, first aid instruction, physical examinations, supervision of plant hygiene, and health consultation are duties he can carry out.

Another plan is the formation of a unit or group capable of rendering a similar service to a number of small plants. This has been carried out in modifications fairly successfully.

In Springfield, Vt., a working arrangement has been established whereby the physicians of the community spend time in two plants by rotation. It is a cooperative plan between management and the local profession. Apparently it is mutually satisfactory. It is reported that some of the doctors are so fascinated by the work that they spend considerably more than the stipulated time in the plant.

The important part of all these methods is that work is done in the plant. Probably no one method will serve the purpose of all areas, yet there are practical methods in operation. It behooves the medical profession to solve this matter. The time will come when management will rightfully expect that any physician worthy of caring for the injuries incident to the operation of a plant will have knowledge of and render preventive service. It will be a recognized responsibility. It has been found advisable to have one supervisor or

foreman to about every 10 workers—why should not comparable consideration be given to his health.

NURSING

Nursing is an important component of industrial medical service. Full-time nursing service is not only advisable but essential in all but the smallest plants. Its scope has broadened with the development of preventive procedures. No longer is the nurse's attention confined to first aid treatment. She is expected to take an active part in health education and within the limitations of her ability become interested in the correlation of the employee's physical condition and the influence of his surroundings while at work. And in this broadening lies the crux of the matter of developing preventive industrial nursing.

There are many nurses working in industry without background or training in prevention or health education. They have been carrying on well, within the limits of their understanding. Recently they have been confronted quite precipitantly with a movement which implies that for years they have been remiss in their duties as industrial nurses and that only those with public health training are capable of working in this new field.

This large group of nurses with years of experience in industrial relations should not be set aside but encouraged to broaden their activities to include this preventive phase of nursing. This may be done in the meetings of local nursing associations or clubs or by formal postgraduate courses offered now by a few schools. Unfortunately reports on these courses do not show a very high enrollment.

Part-time nursing service for small industries is receiving considerable attention in several areas throughout the country. There is a similarity in all the plans in operation in that the service is offered on an hourly basis and that the duties of the nurse during these visits include health consultation, first aid, and supervision of conditions in the plant. It has been reported that the demands on her time usually increase. The organizations offering this service are usually staffed by public health nurses who may or may not have formal training or experience in industrial health.

The report of the American Public Health Association's Committee to Study the Duties of Nurses in Industry should reveal the proper plan for nursing service in small industries. It is certain that, to be of assistance in developing industrial health as a whole, any plan should be coördinated with all other phases under medical supervision.

HEALTH OFFICERS

There is one valuable group which has not universally taken up the cudgels for industrial health—health officers, including state commissioners. Notable contributions have come from a few. Unquestionably more would come if their interest could be focused in this direction. The task of technical service and industrial health promotion is too great in most states for the personnel allotted to bureaus of industrial hygiene. The field of industry contains some 50 million individuals whose health has a direct bearing on all the phases in which health departments are working. There is no field more fertile for tuberculosis case finding, nutrition, and health education, venereal disease control, and study of adult illnesses. One of the features distinguishing private practice from health departments is that one studies the individual and the other groups. The health department thinks about the incidence of disease in a community as a whole. But here is this large assemblage of workers—collected under one roof so to speak—that has received practically no attention as

such from the specialists in group health—the health officers.

THE WORKER

In reality in considering industrial health, the workers come first. Individually and collectively they are the prime beneficiaries. In fact, any program which does not achieve this end is certain to fail in time, for if the worker does not gain better health one way or another, none of the good we claim will accrue. This is a fundamental principle of industrial health—yet it needs to be promulgated among all interested agencies, and particularly among wage earners. Many plans for health education in industry have been set forth. None to date has utilized the influence of workers' organizations.

Too frequently we encounter the attitude that the wage earner is opposed to health plans. In some instances this is true, but is usually due to a lack of understanding of the objectives, or an unsound plan. In no program properly conceived can this be considered an insurmountable obstacle. Some form of representation of the wage earner should be included in the planning and execution of every program of industrial health.

THE EMPLOYER

"The worker being the prime beneficiary—the employer is the number one consumer of industrial health." If the employer is not interested to the point of expanding his program, obviously there is no market. He is the one who puts programs into effect. The only areas which have made significant progress are those working intimately with a local industrial organization. The signal success of such a working arrangement in Connecticut is outstanding.

These groups, then, the workers, employers, nurses, the medical profession —industrial and practising physicians, health officers, and industrial hygienists—are the main parts in the structure of industrial health, each fitting into its proper position. But as organizations each needs assistance in making effective its efforts in relation to all others. While it may appear that each phase is an entity, there is an actual multiple interlocking dependence which makes each unit or phase necessary to a properly integrated whole. It is recognized that there are other interested parties that may contribute materially, such as safety and personnel organizations, insurance companies, industrial commissions, rehabilitation agencies, and voluntary health agencies.

The extension of industrial health requires leadership at state and local levels to bring about concerted effort. Industrial health should center in the medical profession, and that includes every specialty—health officers and industrial hygienists not excepted. As matters have progressed, the Council on Industrial Health has become more impressed with the responsibility placed upon the medical profession by the leadership in industrial health. The program outlined for both state and county committee activity consists of:

1. Organizing and carrying out a plan of activity
2. Educating the medical profession and industry in preventive measures as applied to the worker
3. Coördinating the efforts of all agencies

The Council has recommended that the membership of all coöperating state and local committees include representation from the local bureau of industrial hygiene or the health department. In the formative stage it was felt that their technical training and close association with industry would be of valuable assistance to such committees. This belief has been justified. Programs on industrial health have been enhanced wherever coördinated effort has been applied, particularly since the viewpoint has broadened from that of occupa-

tional disease control. This coöperative activity should not be confined to medical industrial hygienists. Plant management has learned to turn to the bureaus for advice in environmental control. This is an ideal opportunity for outlining a well rounded medical service and more industrial hygienists should capitalize on it.

At present industrial health is faced with an emergency which can only be met by the balanced development of a program. By fulfilling these requirements a structure will have been built which will assure the future of industrial health.

The indicated course of action to meet the war emergency and develop a long term program is—

1. Promulgation of the modern concept of industrial health among and by all interested agencies
2. Education of the personnel necessary to supply this service
3. Coördination of all activity in such a manner as will assure even development and mutual assistance

The responsibility of the medical profession and allied groups to apply modern industrial health measures supercedes all non-military demands on their ability. The recognition and discharging of this responsibility is the greatest contribution they can make toward the successful completion of this war.

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Dissolved Air as a Source of Error in Fermentation Tube Results

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IN the course of a comparative study of media for detecting the presence of coliform organisms in water, it was remarked that bubbles of gas were appearing with suspicious frequency in Durham fermentation tubes of an experimental medium which previously had yielded satisfactory results. The medium in the great majority of the tubes containing these gas bubbles was clear or only slightly turbid, and upon transfer from such tubes to eosin-methylene-blue agar, either no colonies, or atypical colonies that failed to ferment secondary lactose broth, developed on the plates.

A closer study of these abnormal results revealed that they first appeared after a slack, mid-winter holiday period of about 15 days. Since the tubes of medium then employed had been in the refrigerator more than 3 weeks, and since the gas bubbles formed upon incubation did not seem to be the result of bacterial fermentation of the contained lactose, it was suspected that these apparently false presumptives might be due to the liberation, upon incubation, of air that had been dissolved by the medium during the extended period of storage at the low temperature. This suspicion appeared the more justifiable because the experimental broth had been kept in the refrigerator to prevent excessive evaporation, whereas the other media, which had caused no difficulty, and the supplies of which are frequently renewed because of their constant use in routine work, had been kept at the room temperature of the laboratory. Obviously, the conditions under which the experimental broth was stored were conducive to concentrations of dissolved air greater in the experimental broth than those to be expected in the other media.

Fortunately the validity of this explanation of the suspected false presumptives was susceptible of immediate proof, for a few tubes of the lot of experimental broth that had been employed still remained in the refrigerator. Upon overnight incubation of these tubes at 37° C., gas formation was observed in nearly two-thirds of them, the diameter of the bubbles in some being as large as 2 mm.

This interesting observation led to a study of the solubility of air in broths of various concentrations at different temperatures. Lactose broths, of one, two, and three times the usual concentration employed in water work were prepared, distributed in bottles of 5 cm. diameter, 100 ml. in each bottle, and autoclaved at 15 lbs. for 15 minutes. The dissolved oxygen in the contents of one bottle of each concentration was determined by the Winkler procedure * of Standard Methods immediately after sterilization and after 4, 7, 11, 16, 22,

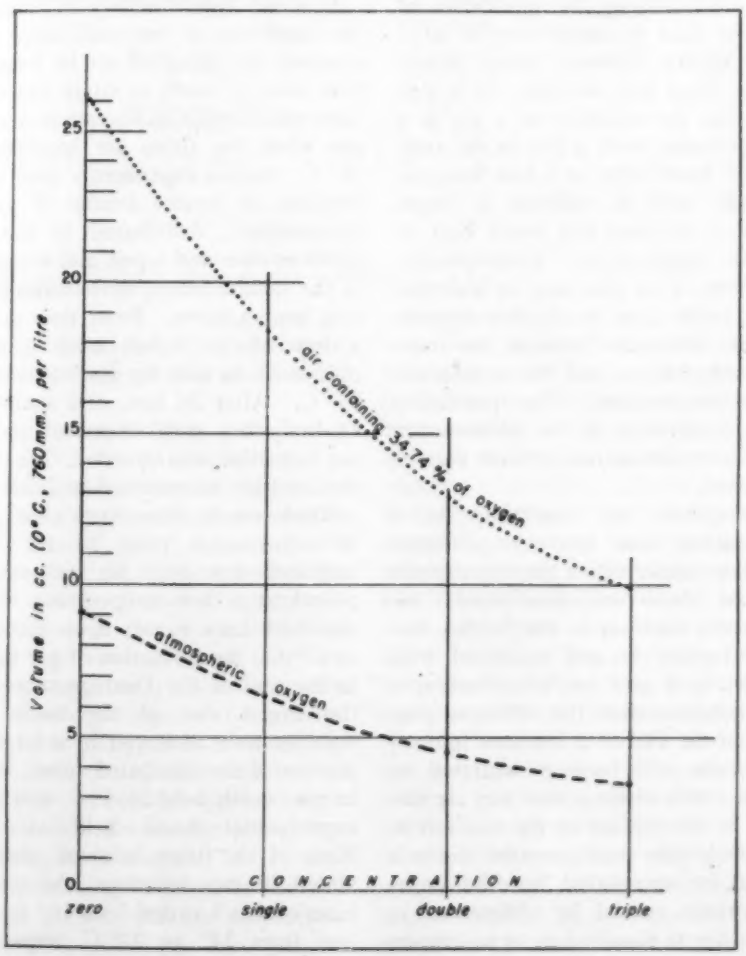
*Although the routine Winkler method perhaps does not yield strictly correct results when applied to lactose broths containing various concentrations of organic matter, it was considered sufficiently precise for the purpose of this study.

and 42 days of storage in the refrigerator at approximately 4° C.

The dissolved oxygen contents of all the broths were found to increase, from very low figures immediately after sterilization, to maxima (saturation) in the 4 day samples, the results of subsequent tests remaining practically unchanged. The amounts of dissolved oxygen found were 9.2 mg. per liter in the single strength broth, 6.4 in the double strength broth, and 5.0 in the triple strength broth. These figures express approximately the solubility of atmospheric oxygen in these broths at a temperature of about 4° C. Figure 1 shows graphically the same results in ml. per liter (0° C., 760 mm.); the curve has been completed by indicating also the volume of atmospheric oxygen that water alone, which may be considered as a broth of "zero concentration," can dissolve at the same temperature.

Figure 1

Solubility of atmospheric oxygen and of air in lactose broths of different concentrations at the temperature of 4° C.



Included in Figure 1 is a second curve, calculated from the oxygen figures on the assumption that the volume of dissolved oxygen is 34.74 per cent of the dissolved air at 4° C. (composition of air in water saturated at this temperature), showing the approximate volume of *air* that may be dissolved in these broths. This hypothetical curve indicates not only the effect of the concentration of the medium on the solubility of air, but also the appreciable volumes of air that broths of various concentrations may be expected to dissolve at the temperature of the refrigerator.

When considering the application of the above data to bacteriological laboratory practice, however, many factors must be taken into account. It is well known that the solubility of a gas in a liquid decreases with a rise in the temperature: broth kept at a low temperature will hold in solution a larger volume of air than will broth kept at a higher temperature. Consequently, the volume of air that may be liberated from a broth upon incubation depends upon the difference between the incubator temperature and the antecedent storage temperature. The possibility of the occurrence of the phenomenon known as supersaturation must also be considered.

Furthermore, the conditions in a fermentation tube are very different from those under which the experiments described above were conducted. Although the medium in the bottles employed rapidly became saturated with air when held at a low temperature, it is improbable that the medium contained in the vial of a Durham fermentation tube will become saturated so quickly. It is obvious that any air dissolved at the surface of the medium in the outside tube must, in order to reach the vial, be transported, by diffusion or by currents caused by differences in density due to dissolved air or to temperature, first to the bottom of the tube and then into the vial. The transfer from the surface to the bottom of the outside tube may be effected rapidly; but the rate of passage of the air into the vial will depend upon the size of the opening between the rim of the latter and the bottom of the outer tube: if the opening is small, the air will pass very slowly, probably almost entirely by diffusion, from the tube to the vial. If, on the other hand, the opening is comparatively large (as when the rim of the vial is broken, or when the vial is in a slanting position), the rate of passage into the vial will evidently be greater.

In order approximately to determine the conditions of time and temperature required for dissolved air in fermentation tubes of broth to attain concentrations which result in liberation of visible gas when the tubes are incubated at 37° C., further experiments were made. Supplies of lactose broths of various compositions, distributed in tubes of different sizes and types, and autoclaved in the usual manner, were stored at certain temperatures. From time to time, a few of the tubes were taken at random from each lot and incubated at 37° C. After 24 hrs., and again after 48 hrs., they were examined and any gas formation was recorded. The results obtained are summarized in Table 1.

These results show very clearly that if fermentation tubes of the broths indicated are held for an extended period at a low temperature, the air dissolved may cause, upon incubation at 37° C., the formation of gas bubbles in the vial of the Durham tubes or in the closed arm of the Smith tube. Bubbles were observed in a large proportion of the incubated tubes, both in lactose broth held at 4° C. and in the experimental broth held at 13° C. None of the tubes, however, that were stored in two locations, the temperatures of which varied from 16° to 24° C. and from 24° to 27° C. respectively,

TABLE 1

Effect of Time and Temperature of Storage of Lactose Broths on Fermentation Tube Results When Subsequently Incubated at 37° C.

Tubes: Type	Tubes: Diam. in mm	Volume of Broth	Media	Storage Temperature	Storage Period in Days	Results upon Incubation *	Storage Period in Days	Results upon Incubation *
Durham	25	20 ml.	Lactose broth *1½ times strength*	4°	6–18	0/12	22–35	5/12= 42%
					12	0/3	27–56	2/15= 13%
					7–13	0/6	27–71	18/24= 75%
				16–24°	6–35	0/36		
					12–56	0/18		
					7–71	0/34		
				24–27°	6–35	0/28		
					12–56	0/18		
					7–71	0/36		
	20	10 ml.	Lactose broth *single strength*	4°	—	—	7–41	9/16= 36%
					2–14	0/36	15	1/4
				16–24°	7–41	0/16		
				24–27°	7–41	0/16		
	15	5 ml.	Lactose broth *single strength*	4°	1–7	0/30	8–24	16/65= 25%
					4–9	0/30	10–27	18/64= 28%
			Experimental broth *single strength*	4°	1–7	0/30	8–25	3/70= 4%
					6	0/5	7–29	11/90= 12%
				13°	1–4	0/12	7–17	4/27= 15%
Smith	20	35 ml.	Lactose broth *single strength*	4°	4	0/2	9–30	18/20= 90%
	15	15 ml.	Lactose broth *single strength*	4°	4	0/1	9–27	9/9 =100%

* Denominator = Number of tubes incubated
Numerator = Number of tubes containing a bubble of air

showed gas formation upon incubation, even after storage periods of 35 to 71 days.

The minimum holding period that resulted in liberation of visible gas in the fermentation tubes of broths of normal concentration upon incubation at 37° C. was 7 to 10 days, with the exception of one lot in which no bubbles appeared before 15 days of storage.

An increase in the concentration of broth, at least when Durham tubes are employed, apparently lengthens the period of storage required for production of visible gas upon incubation. In tubes of broth of 1½ times the normal concentration no bubbles appeared upon incubation until the storage period was extended to 22–27 days.

It is interesting to note, in the last column of Table 1, that the proportions of tubes with visible gas vary greatly, even when media of the same composition and concentration, and stored at the same temperature, are employed. This variation is due to several causes: different storage periods, different initial contents of dissolved air after sterilization, and different sizes and positions of openings between the rim of the vial and the bottom of the outer tube of Durham fermentation tubes, and between the open and closed arm of Smith tubes. The results obtained from Smith tubes deserve particular mention: evidently because of the large opening between the open and closed arm, gas bubbles appeared upon incubation of practically all of these tubes after a storage period of only 9 days at 4° C.; moreover, as might be expected because of the comparatively large volume of liquid contained in the closed arm of these tubes of the usual

type employed in water examination, the bubbles of gas produced therein were of considerable size.

Since the solubility of air in water at 37.5° C. is only about 13.8 ml. (0° C., 760 mm.) per liter, whereas that at 4° C. is 26.32 ml., it is evident that if the solubility of air in a broth were the same as the solubility in water, the liquid contained in the vial of a Durham tube or the closed arm of a Smith tube, when saturated with air at 4° C., might release upon incubation a volume of the gas equal to more than 1 per cent of its capacity. Although the solubility of air in a given broth is not exactly that in water, but varies with the composition of the broth, the results of the experiments described establish beyond doubt the important fact that the solubilities of air in various broths are such that visible gas may be released when these broths, after previous storage for several days at a low temperature, are subjected to incubation at 37° C.

The practical importance of the possible effects of storage at comparatively low temperatures of fermentation tubes which, subsequently, are to be incubated at higher temperatures, is self-evident. Bubbles of air resulting simply from a change in temperature may deceive the laboratory worker into believing the gas thus formed to be the result of bacterial fermentation. Not only in the bacteriological examination of water, milk, etc., but also in the differentiation of species of bacteria by means of tests for gas production in sugar media, the possibility of this source of error must be guarded against.

Consequently, in order to prevent the occurrence of false fermentation tube results, there must be added to the usual precaution of avoiding the conversion, by the heat of sterilization, of the fermentable constituents of the medium employed, that of preventing such concentrations of dissolved air in the medium that visible gas will be released upon incubation. To this end fermentation tubes should be stored at temperatures not far below that of 25° C., and be used after only a limited period of storage. If storage of such tubes at lower temperatures for longer periods is unavoidable, however, they should be incubated overnight, and carefully inspected, and those observed to contain air bubbles discarded before use.

SUMMARY

The results of experiments with lactose broths of various compositions contained in fermentation tubes have shown that, when such tubes are stored for a sufficient time at a low temperature, a large proportion of them may contain dissolved air in such concentration as to produce, upon incubation at 37° C., visible bubbles of gas.

Seven days of storage of single strength lactose broth at 4° C., or even at 13° C., sufficed for the production, upon incubation at 37° C., of visible gas in some of the fermentation tubes.

The frequency with which gas bubbles may thus be produced depends upon several factors: (a) the initial concentration of dissolved air in the broth immediately after sterilization; (b) the concentration of the ingredients of the broth; (c) the size and position of the opening between the vial and tube of the Durham tube or between the open and closed arm in the Smith tube; (d) the difference between the temperature of storage and that of final incubation; and (e) the duration of the storage period.

In order to avoid errors in fermentation tube results due to dissolved air, the tubes should preferably be stored at temperatures approximating 25° C. and, since evaporation may proceed rapidly at such temperatures, they should be used after only a limited period of storage.

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THE AMERICAN PUBLIC HEALTH ASSOCIATION MEETING THIS MONTH

IT is very nearly an unwritten law that in the fall of each year the Editor of the JOURNAL beat with vigor the bushes of Association membership, to the end that the old dogs and the cats and the bears, and the dears and the foxes and the rabbits and the rats of public health all go lumbering, or hopping or scurrying, as befits their station, to the Annual Meeting of the Association. And aside from bushes-beating, certain bait, differing from time to time, is set out: the increase in knowledge that comes from such attendance; the broadening of acquaintanceship; the celebrities to be seen and, inevitably, heard; the meeting of old friends; the coming together of North, South, East, and West, Canada, Mexico, Central and South America. Sometimes even, in this attendance-getting effort, guarded reference is made to the sociability to be found, if one knows where to look for it, when austerity goes out the window and back hair comes down. These benefits and pleasures are parts of any annual meeting of any association, where people with common interests gather: serious, scientific and orderly sessions, plus a decent after-hours gaiety.

For the meeting to be held in St. Louis the latter part of this month we beat no bushes, we set no bait. Nor have we any desire to give a light touch to the soberness of the occasion. The mere fact that the meeting is to be held, in spite of war conditions, is testimonial to its seriousness of purpose and to its necessity. Some five to ten years ago, when routinism was pretty deeply rutted, it probably would not have mattered much if an annual Association meeting had been cancelled, unless that particular meeting would have pulled things out of the rut. Today the situation is on the one hand encouragingly different and on the other distressingly so. Public health workers are faced, as never before, with many new and many more problems. Shifting of populations, concentration of troops and war industries, depletion of the ranks of practising physicians, losses of personnel on public health staffs—all these things have changed the tempo and confused the situation. There is another problem, too, that needs attention. It is this: No longer is it sensible or practicable to regard the public health activities or the stand-

ards under which they are performed, the recruiting and training of personnel, or the problems of finance as being entirely prerogatives and obligations of the locality in which this health department or that operates. In all the nations of the world today, and probably for a long time to come, life and living must be in terms of national economy and national effort. To function on such a basis, public health work must be retooled, for although coördination between federal, state, and local health agencies has in the past been rivaled only by similar coöperative effort in agriculture, and has far surpassed that of other governmental bureaus, direct public health service is still geared essentially to the existing pattern of state and local governments. Serious thought, therefore, needs to be given to those adjustments which, without destroying the basic structure of state and local responsibility, will permit and assure national influence and assistance in meeting problems wider than state boundaries.

These things are to be discussed at the meeting this month. Only through contributions from all the far reaches of this country and this hemisphere can a wise course be plotted.

TO A FEW GOVERNORS AND MANY POLITICIANS

GOVERNOR, why in Heaven's name can't you keep your hands off your department of health? Surely, in calling a physician to treat a member of your family, you would not be guided by the advice of a political campaign manager, nor would you be influenced by the fact that one doctor is a Democrat and another a Republican. If your child had pneumonia or were otherwise seriously ill, you would not wait to find out how this physician or that had voted in the last election or how much he is likely to contribute to the next campaign fund. And, having a family physician, you would not, certainly, change to a less competent one merely because you found that he had been unwilling to perform some political chore for your good friend Senator Soandso. No, one who has sense enough to attain leadership in political affairs doesn't engage or dismiss a private physician as a matter of political expediency, because the danger of disaster is too close home. But have you ever thought, Governor, of the responsibility you assume in the hiring and firing of the state health officer and other personnel in the health department of the state for whose health and well-being you bear the ultimate responsibility? It is not a matter to be taken lightly, nor is it one that can be settled by paying a political debt.

Illnesses and deaths which occur because of unwise decisions and acts on your part, sir, are, of course, way out on the fringes of things, too far off and too intangibly related to your affairs ever to be recorded on the debit side of your record. Nevertheless, these catastrophes exist as grim effects of definite causes. An incompetent worker here, a political-minded appointee there, through ignorance or dereliction of duty or even by sheer laziness, may set in play a chain of events that will as surely result in disaster as would a fumbling surgeon in the operating room. Or the untrained health officer, for want of knowledge as to the conduct of a modern health program, may, by omission, permit unnecessary sickness and funerals. An incompetent laboratory worker may fail to discover the danger in a water sample or may read incorrectly the picture under the microscope, or misinterpret the story told in a test tube. These things, sir, are not dramatic, are seldom discoverable, and sometimes will occur in spite of every precaution.

But, Governor, is it not your responsibility, your opportunity, to appoint to positions in your health department only those persons in whom sins of omission and commission are least likely? And who are these persons? The answer is not difficult. They are those who by training and experience in public health work and by personal integrity have demonstrated professional competence, sound judgment, and trustworthiness. Many of them are already in your department of health. They are faithful, diligent workers, jogging along on low salaries, never at political rallies, unknown to your organization, asking only to be permitted to do their jobs. *Governor, please, in all decency, leave such people alone!* Sometimes, the person you will need for a particular job may live a thousand miles away. If he does, sir, will you bear in mind the fact that competence and incompetence are not determined by state boundaries. If in your own state you cannot find the right person, don't pull the work down to the level of whatever or whoever is available among registered voters.

The protection of the public health is a serious job, and a hard enough one at best. At present, many of the most competent workers must be yielded for military duty, because they are young and robust, and the Army and the Navy need them. At this time, then, above all, don't throw your political weight about in the health department. If there are incompetents on the job—and no one can deny that there are some—they must be rooted out. But in discharging such persons, first get a good state health officer, or *keep the one you have if he is competent,* and let him make the decisions on the basis of their records and in accordance with the merit system which it is to be hoped you have provided or will adopt.

We ask this, Governor, not so much for those who might have lost or might lose their health department jobs for political reasons. Though such unfair treatment is hard on them as individuals, their plight is relatively unimportant. But we do ask for competent public health workers for the sake of the people who look to you for wisdom and protection. Further, Governor, if you are one of those inclined to regard health department jobs as part of a patronage pool, please be advised that years ago this went out of fashion, even in the realm of political expediency. It is generally regarded as poor politics, lacking in finesse, and likely to be resented by the better element among your constituents, particularly by the women. The latter can raise the devil of a row about that sort of thing, and they don't care what they say, or to whom or when or where they say it. And, finally, sir, those governors who play politics in health departments constitute only a rapidly dwindling minority. If you do this and keep it up you are going to find yourself alone, unhonored and unsung, maybe un-officed.

P.S. Your personal physician is not likely to make a good state health officer.

BOOKS AND REPORTS

Health Education of the Public—*By W. W. Bauer, B.S., M.D., and Thomas G. Hull, Ph.D. Foreword by Morris Fishbein, M.D. (2d ed.) Philadelphia: Saunders,* 1942. 315 pp. Price, $2.75.

The preparation of a useful handbook for health education is a large task; a revision is far from simple, requiring initiative and perspective. The second edition of this instructive and practical volume reveals imagination and judgment in the selection of illustrations and an insight into the needs of both the field worker and the instructor in the clear presentation of subject matter.

In bringing their well known book up-to-date, the authors, well equipped for the task, added new chapters on a Philosophy of Health Education and on Training and Qualifications, besides featuring a study of words habitually used by doctors in writing for the public. Chapters on health meetings, motion pictures, exhibits, radio, and the newspaper have been revised; chapters on stereopticon slides and on correspondence contain many helpful suggestions; a discussion of measurement of results should promote further study in this important phase of the subject. Anyone engaged in community health education, whether as administrator, specialist, student, or teacher, will find valuable assistance and stimulus in this new edition.

IRA V. HISCOCK

Essentials of Nursing—*By Helen Young. New York: Putnam,* 1942. 609 pp. Price, $3.00.

This book is written by a group of authors who worked together in teaching nursing arts in the School of Nursing which is connected with the Presbyterian Hospital in New York City. The school was founded fifty years ago by Anna C. Maxwell, and this volume is prepared as a tribute to her. It will also be a memorial, for all the royalties are to be devoted to the scholarship fund of the Alumni Association.

There is significance in the fact that the central theme of *Essentials of Nursing* is the patient. All through the book emphasis is placed on contact with the patient, and the reaction of the patient to treatment is given importance.

While written for teachers of nursing arts and their students, the book will be of equal or greater value to the graduate nurse as a reference book. The illustrations are numerous and excellent, and technics are in sequence and logically described.

The material on nursing patients for communicable diseases is particularly well done as is that on nursing patients on whom a tracheotomy has been performed.

All procedures in surgical nursing are especially well described. Obstetrical nursing and charting, perhaps by contrast, appear to have been somewhat neglected.

For the student nurse it would have been desirable to have given more attention to principles underlying procedures, but for the graduate it is entirely adequate.

ELNORA E. THOMSON

A Handbook for Assistant Medical Officers of Health on Child Welfare and School Medical Work—*By F. J. G. Lishman, M.D. London: H. K. Lewis & Co., Ltd.,* 1942. 61 pp. Price, $1.50.

This handbook was prepared to guide junior medical officers who

were added to the staff of the Devon County Council, England, as a result of the migration in 1939–1941. It will give American public health officials a brief but satisfactory account of procedures in the Maternity and Child Welfare Centres and School Medical Services in England. The Welfare Centre is described as primarily educational. Ten minute talks to mothers by the Medical Officers are mentioned, and printed instructions are recommended to be issued singly at appropriate intervals.

The School Medical Service is given the major attention and shows the tendency in England as in this country to use the observations of teachers and principals to select children in need of medical attention. There is, however, more emphasis on routine examinations than is recommended by the latest American viewpoint. Twelve examinations per hour including parent conferences, is described as normal practice, but a rate of six per hour is mentioned as "necessary for adequate discussion of the child's health with the parent." School clinics for treatment of "minor ailments" are described as more efficient than referring children to the family doctors. "Curiously enough," says the author, "children suffering from otorrhoea are also considered to have a minor ailment."

Procedures and records are outlined sufficiently to indicate the routines of practice but they do not make clear the educational possibilities of the services. The Appendices containing "model leaflets" for parents are an interesting feature indicating some advice not altogether consistent with our best American practice. HAROLD H. MITCHELL

The American Pocket Medical Dictionary—*By W. A. Newman Dorland. (17th ed.) Philadelphia: Saunders,* 1942. 1037 pp. Price, $2.00; thumb indexed, $2.50.

A compact and well edited dictionary, with definitions usually clear and to the point. In the communicable disease field the information is reasonably up-to-date, though transition from the old bacterial nomenclature is incomplete. Considering the inherent difficulty in such condensation, it is well done. REGINALD M. ATWATER

Sex Guidance in Family Life Education: A Handbook for the Schools—*By Frances Bruce Strain. New York: Macmillan,* 1942. 340 pp. Price, $2.25.

Mrs. Strain has made an outstanding contribution to a field that has been full of confusion for well over forty years. The need of getting away from the disastrous Victorian silences was met by enthusiastic converts who plumped over backward for detailed biological lectures to young children. Now that parents are rather generally ready to use the help of the school, the educators must be able to furnish realistic answers to the questions that start out with irreconcilables. This book is addressed directly to school people, who have been acquiring a sense of obligation regarding "sex education" but without being able to discharge it in terms of curriculum, content and methods, and other school categories. Here they are told *how*. Some of the main topics treated are: Gaining Community Support, Matters of Organization, Needs at Various Age Levels, Personal and Academic Qualifications of Teachers, and Counseling Center.

Mrs. Strain's book presents a sound philosophy regarding the functions of schools and homes in the child's education, and clarifies the issues which underlie most of the confusion. As one of the few persons who have been able to try out the possibilities of the school, she can speak to teachers in their own language. The book is full of concrete suggestions as to procedures, without

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being dogmatic as to "subject matter," and without descending to the fallacy of offering "techniques of instruction." Indeed, one of the valuable features of this treatment is its help in clarifying for teachers the possibility of guiding educational procedures through a dynamic understanding of young people and children, rather than formal rules of teaching. This will be a valuable aid in orienting schools toward children as members of families and as prospective founders of families.

SIDONIE MATSNER GRUENBERG

Prostitution and the War (Public Affairs Pamphlet No. 65)—*By Philip S. Broughton. New York: Public Affairs Committee,* 1942. 32 pp. Price, $.10.

This excellent publication issued by the Public Affairs Committee of New York presents the problem of prostitution from a public health point of view rather than dealing with the moral aspects of the problem. The age old question of segregation and examination of prostitutes as a means for the control of venereal diseases is directly handled. No shadow of a doubt should remain in the reader's mind as to the incompatibility of this procedure with the reduction of the incidence of venereal diseases.

The amount of exposure which is experienced by a prostitute in an open house of prostitution is clearly shown. The average prostitute has from 25 to 40 sex exposures in her working day and this may be increased to as many as 60 to 65 on busy days. Such a woman obviously acts as a mechanical vector of syphilis and gonorrhea and is not necessarily afflicted with the disease which she spreads. Such conditions are not compatible with medical examination. The mere closing of open houses of prostitution lowers the venereal disease rate of a community because the number of sex exposures of a prostitute operating as a street walker rather than in an open house of prostitution is reduced from 25 to 40 exposures to from 2 to 4 exposures in each working day.

The material is presented in very logically arranged form explaining the responsibility and function of the various official agencies from a national and local level, the problem of prostitution, the social responsibility of the community, and the national need for local action. Specific local experiences with problems under discussion are offered to strengthen the various points presented.

This important publication should be read by every law enforcement officer in the country and it should prove to be of great assistance to venereal disease control officers and venereal disease control public health nurses in selling repression of prostitution to their local communities.

J. C. GEIGER AND RICHARD A. KOCH

American Foundations and Their Fields—*Compiled by Geneva Seybold. New York (330 W. 42nd Street): Raymond Rich Associates,* 1942. 274 pp.

Once again Medicine and Public Health head the list of purposes for which grants were made in 1940 to various fields by 134 American Foundations.

A total of 12¼ millions went to these purposes in the latest year of record, amounting to 30.4 per cent of all the grants by foundations. Education, Social Welfare, the Physical and Biological Sciences, and the Social Sciences follow Medicine and Public Health in that order. Grants to religious purposes now stand at 3 per cent of the total, whereas fifty years ago these topped the list.

This volume, the fifth in the series, is again prepared by Raymond Rich Associates of New York and is much

the most comprehensive review available. The activities of 314 foundations, with total capital funds in excess of one billion dollars, are included. Even this is not all the so-called "foundations."

A wealth of information is available regarding these agencies, their fields, their officers and directors, and the expenditures of their funds. A highly recommended volume.

REGINALD M. ATWATER

The Fundamental Principles of Mathematical Statistics: *With special reference to the requirements of Actuaries and Vital Statisticians—By Hugh H. Wolfenden. New York: Macmillan Company of Canada, for the Actuarial Society of America,* 1942. 379 pp. 35 diagrams. Price, $5.00.

This book attempts to assemble and coördinate those portions of the theory and applications of mathematical statistics which are needed by actuarial beginners and by qualified actuaries. Essentially it is an exposition of the subject of probability in the classical manner, with emphasis on the theory of errors and least squares. The arrangement of the material is novel in that the main text is a condensed presentation largely devoid of mathematical proofs and applications. These aspects are reserved for separate sections of the book, one on *History,* a second on *Mathematics and Interpretations* containing proofs, and a third on *Applications,* particularly to actuarial data. The Bibliography of 367 references is divided into two parts to denote historically important and currently useful publications.

The exclusion from the main text of the treatment of history, mathematical proofs, and applications inevitably leads to a degree of discontinuity. The reader interested in all aspects of a given topic must refer continually from section to section. This reviewer feels that the bird's-eye view of statistics given in the main text is inadequate for an elementary student without considerable mathematical attainment and that a mathematically versed student would prefer to have the later sections appropriately inserted.

The usual ideas on probability are presented, leading up to the point binomial and its approximation by ordinates and areas of the normal curve. The use of the modulus of the normal curve instead of the standard deviation will seem awkward to many readers. The various types of sampling of attributes, as Bernoulli, Poisson, Lexis, and their relation to the chi-square test of heterogeneity are discussed. The sampling theory of means and standard deviations for large and small samples are adequately treated, but it is unfortunate that the distinction between the theory appropriate for the sampling of attributes and that of measurements is not more sharply drawn.

There is the usual treatment of systems of frequency curves, including those resulting from scale transformation. The author also discusses curves of particular interest to the actuary, as the life table functions, mortality laws, laws of population growth.

The author takes up in some detail topics considered only briefly or not at all in many treatises on mathematical statistics. These include a demonstration of the standard errors of functions of a variable, in some cases by the use of a Taylor's Series. Thus he evolves the standard errors of the life table functions. Consideration is also given to the multinomial law and its relation to the normal surface and to chi-square. There is an excellent discussion and comparison of various methods of curve fitting and graduation, as maximum likelihood, least squares, moments, minimum chi-square, together with criteria for testing goodness of fit. Another unusual feature is the presentation of the method of fitting transcen-

dental trends by the use of Taylor Series.

Some of the more recent advances in mathematical statistics, as confidence limits, testing of hypotheses, analysis of variance, are mentioned only briefly.

This book should be an exceedingly useful reference manual to the vital statistician, since many of his special tools are given more adequate treatment here than in most works on mathematical statistics. JOHN W. FERTIG

Handbook of Hygiene—*By Joseph W. Bigger. (2d ed.) Baltimore: Williams & Wilkins,* 1941. 414 pp. Price, $4.50.

This book, intended primarily for medical students, contains 404 pages of text and 10 pages of index. It is well arranged, the material is presented in a clear-cut and concise manner and with a commendable directness. It reflects the points of view prevailing in Great Britain and, in general, the illustrative data are drawn from abroad. For American readers this is not disadvantageous as it tends to broaden the horizon.

However, the abbreviations on pages 64 and 65 for biologic agents used in immunizations are meaningless to most American readers. Apparently, American and British experience is not parallel as to the frequency of positive Mantoux tests among adults. Because of the imperfections in the system of compulsory vaccination in Great Britain, and the admitted dangers involved in the measure, the author questions whether vaccination might better be restricted to actual exposures in a country where the disease is not endemic. This assumes the existence of an elert, efficient, and integrated system of local health services, which we do not have in the United States. Even if but half of a population has a relative immunity to the disease, this constitutes a barrier of no mean value.

In view of the serious problems created by acute types of encephalitis in the United States, our medical students will find the chapter limited to encephalitis lethargica particularly inappropriate.

Concerning pulmonary tuberculosis the author states (page 82) " From the point of view of prevention, it is sufficient to know that the bacilli enter the body with inspired air contaminated either by droplets or dust." One is permitted to doubt that this statement as it stands is adequate.

In the chapter on disposal of wastes, the scant mention of the problem of back-siphonage leaves the reader completely uninformed as to the importance of this subject.

These and other points which might be mentioned do not detract from the value of the book as a whole. For its intended purposes, it must be rated as among the best of its type.

M. E. BARNES

Stedman's Practical Medical Dictionary—*Edited by Stanley Thomas Garber, B.S., M.D. (15th ed.) Baltimore: Williams & Wilkins,* 1942. 1,257 pp. Price, $7.00; with thumb index, $7.50.

One cannot review this volume as one would an ordinary text, for the excellence of a medical dictionary depends upon how well the editor has met standards of which the average professional worker is quite ignorant. Obviously there are complex etymological requirements, precedents, and usages that must be observed in such a task, and the lexicographer too must make many difficult decisions not covered by rules. It is not easy to attempt order and consistency and at the same time hold inviolate the terminologies arising from separate, independent, highly authorative sources: the Pharmacopea, the Basle Anatomical Nomenclature, Zoölogical, Botanical, Bacteriological,

and Chemical Nomenclature, to say nothing of those dealing with Nosology.

Stedman's has always been one of the better medical dictionaries, and in the fifteenth edition Dr. Garber, the present editor, seems to have met these various problems expeditiously and completely. The new type is pleasing to the eye and, by appropriate contrast in boldness and size, guides one quickly to major headings, sub-headings and interpolations. With a publication date of June, 1942, the contents are inclusive and fresh.

H. S. MUSTARD

War Gases—*By Morris B. Jacobs, Ph.D. New York: Interscience Publishers*, 1942. 180 pp. Price, $3.00.

With the threat of an attack on our shores growing daily, the problem of defense against chemical warfare agents becomes an important one. The publication of this concise reference handbook on the war gases is therefore very timely.

The problem of war gases is approached from the point of view of the analytical chemist. The physical and chemical properties of the war gases are concisely and completely presented. The analytical procedures are arranged after the fashion of laboratory handbooks and are easily accessible. The book is of limited use to those concerned with the medical aspects of chemical warfare, since it contains little or nothing concerning the pharmacological or pathological aspects of chemical warfare agents.

The reviewer, who is not an analytical chemist, has been informed by qualified individuals that the material is accurate and that all modern available information has been carefully and accurately recorded, although lack of adequate documentation makes it difficult to locate the source material.

This book fills a need in the chemical warfare field and should be useful to all non-medical gas officers (state gas consultants and senior gas officers) concerned with civilian defense.

DAVID D. RUTSTEIN

Housing for Health—*Papers presented under the auspices of the Committee on the Hygiene of Housing of the American Public Health Association*, 1941. Available from A.P.H.A. Book Service. 221 pp. Price, paper, $1.00.

The discussion of the criteria for the adequate housing of people has been the concern of investigators in this field for well over a century. During all this time the health aspects of the problem have taken a prominent position. The public health administrator, the physiologist, the social worker, the economist, and the lay citizens have all struggled with the problem in the hope of eventually developing standards of application which would be acceptable to the public at large and which would be within the realm of orthodox economic acceptance.

It has only been within recent years, however, that the public health profession has in an increasing degree made it its business to analyze the issues involved in a methodical and scientific manner, characteristic of its approach to other problems. When the Committee on the Hygiene of Housing of the American Public Health Association was created a few years ago, it set about the task of literally shedding light upon the details of housing necessity and housing requirements. Through these recent years a number of valuable studies and resulting papers have appeared under the general direction of the committee.

The volume now under review represents a collection of these documents published for the committee by the Milbank Memorial Fund as a further evidence of the Fund's continuing interest in the hygienic aspects of housing. The volume contains some 15 papers and reports, adding to the hitherto rela-

tively meager quantitative or engineering aspects of hygienic housing.

Important as this addition to knowledge is, the volume goes far beyond this contribution and provides an interpretation of the basic principles of hygienic housing. It relates its principles to municipal codes and their enforcement, to the technics of surveys and appraisals, and to the general problems of planning for recreation and decent family life.

One cannot read the volume without recognizing promptly that the issues involved in housing will far exceed the equipment, experience and perspective of the individual specialist in any field. The problem is one of joint integration of the technical and social activities of the physician, the engineer, the city planner, the law maker, the housing official, the mayor, and the interested lay citizen.

The collection of papers comes at an opportune time when the public health profession needs so much to be oriented with respect to modern housing. The volume, therefore, provides an excellent source for instruction, not only to the specialist in housing, but particularly to the practitioners in public health work to whom the public looks for guidance in matters related to housing.

It is interesting to point out, furthermore, Professor Winslow's comment in the volume that more damage is done to the health of the child of the United States by a sense of chronic inferiority due to the consciousness of life in substandard dwellings than by all the defective plumbing which these dwellings may contain. ABEL WOLMAN

Anoxia: Its Effect on the Body—*By Edward J. Van Liere. Chicago: University Press,* 1942. 262 pp. Price, $3.00.

This timely volume attempts to summarize the available information on the effects of lack of oxygen on the body. Many of the tables and figures have appeared in other monographs. The various organ systems are treated in a systematic manner, but no mention is made of the effects of altitude on the reproductive function. Although certain studies concerning the anemic, stagnant, and histotoxic forms of anoxia are cited, most of the data deal with the effects of decreasing the oxygen tension in the inspired air. The general reader will welcome the sections on the definition of terms and the classification of anoxia. The author's distinction between asphyxia and anoxia is commendable. Many investigators will not accept the interpretation that the erythrocyte changes which occur when man is subjected to anoxia are the result of splenic contraction. The chapters on acclimatization and the effects of anoxia on the central nervous system are interesting. The chapter concerning the effects of anoxia on the alimentary tract reviews Dr. Van Liere's work on the relation of oxygen lack to the function of this system. The reviewer regrets that the titles of the individual references are not given.

WALTER S. ROOT

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Two Hundred and Nine Needless Deaths—There is a tendency for diphtheria to become relatively more prevalent among higher age groups as the protective program for infants and preschool children continues. This finding concludes the annual compilation of diphtheria deaths during a year with no extensive outbreaks, but in which the decline, though actual, was far less impressive than in preceding years.

ANON. Diphtheria Mortality in the Large Cities of the United States in 1941. J.A.M.A. 119, 18:1503 (Aug. 29), 1942.

Typhoid Continues Its Decline—New England, the Middle Atlantic, and North Central states have maintained their enviable record of low typhoid fever rates. Noteworthy too are the significant decreases in the cities of the South Central states, in this annual compilation of reported typhoid fever deaths.

ANON. Typhoid in the Large Cities of the United States in 1941. J.A.M.A. 119, 15:1188 (Aug. 8), 1942.

When Old Folks Must Carry On—Attempts to improve the health of the aged through education are especially timely, for as fewer physicians are left to care for the civil population, there will be less and less medical attention available for the aged ill. Longevity, unless accompanied by health and ability to work may become a social evil, philosophizes this writer. To which we say: Amen.

DUCKLES, D. Nutrition in Geriatrics. J. Am. Dietet. A. 18, 8:508 (Aug.), 1942.

Facts vs. Enthusiasms—There is no evidence that any vitamin or hormone has any direct relationship to arthritis. Where a specific deficiency coexists, vitamins or hormones may help the patient, but not cure the arthritis. Ordinarily, articles on medical treatment are excluded from this bibliography, but this paper seems to be of public health significance.

FREYBERG, R. H. Treatment of Arthritis with Vitamin and Endocrine Preparations. J.A.M.A. 119, 15:1164 (Aug. 8), 1942.

Real Progress After a Hundred Years of Study—Just where we stand in the matter of polio research, prevention, and care is told in the fewest possible words, and clearly too, in this paper read before the annual meeting of the Canadian Public Health Association.

GUDAKUNST, D. W. Poliomyelitis: Control and Treatment. Canad. Pub. Health J. 33, 8:365 (Aug.), 1942.

Credits and Debits in National Nutrition—Failure in peacetime to meet the needs that were then known to exist resulted in impaired man power for the defense of the country in time of war. If we are to profit by past failures, we can make the children of our war generation better able to put the world together again. How this can be done is the nub of this discussion.

HESELTINE, M. M. Nutrition—Today and Tomorrow. Pub. Health Nurs. 34, 8:428 (Aug.), 1942.

More about Nutritional Shortcomings—At one hospital, one-fourth

of all patients had been on a deficient diet, and of these 11.4 per cent showed definite signs of vitamin deficiency.

KRUPP, M. A. The Incidence of Nutritional and Vitamin Deficiency. J.A.M.A. 119, 18:1475 (Aug. 29), 1942.

Mental Health in the Sticks—Work of a mental hygiene unit, in the suburban sections of a county with exceptional social services, is described, and health departments in less favored counties are urged to go and do likewise.

LOTT, G. M. Mental Health Services in Rural Areas. Pub. Health Rep. 57, 31:1115 (July 31), 1942.

Ability To Work—Some illuminating statistics about the distribution of industrial and non-occupational illnesses, and time losses by sex and age groupings, are appended to this discussion of industrial health. It is pointed out that two-thirds of the lost time cases return to work on Monday. If recovered workers could be induced to return to the job as soon as they are able instead of waiting until the beginning of the succeeding week, a lot of lost time would be saved.

LYNCH, D. L. Industrial Health and the War. New Eng. J. Med. 227, 6:209 (Aug. 6), 1942.

More about Polio—Though you may be aware of the present status of poliomyelitis control, you may profit from reading this clear and brief summary of the state of our understanding.

MILZER, A., and LEVINSON, S. O. Recent Research in Infantile Paralysis. Pub. Health Nurs. 34, 8:434 (Aug.), 1942.

Children in a "War of Nerves"—Health workers interested directly, or remotely, with the welfare of children will welcome this symposium which is an outgrowth of a course given to teachers in New York City public schools. Psychology has become a deadly war implement. Methods of arming children against it are discussed.

PEPPARD, S. H., *et al.* Mental Hygiene and Children in War Time. Ment. Hyg. 26, 3:353 (July), 1942.

Sign of the Times—Leading article in this month's official publication of the Associated Industries of Massachusetts is the story of the state's committee on industrial health (a part of the larger Public Safety Committee). The committee's job is to gather scientific information about workers' health and to make this information available to employers and employees. Eleven more articles on industrial health will follow in succeeding issues of the magazine.

PRENDERGAST, F. M. Our Second Front—Worker Health. Industry. 7, 11:7 (Aug.), 1942.

Fitness To Fight—Of the first 2,000,000 men examined for the Army draft, half were rejected by the examining boards. Selective Service was given the job of rehabilitating one-fifth of these rejectees. Then came Pearl Harbor, and minor defects were no longer disqualifying. Correctible defects are listed, and what has been done in some centers to correct them is related.

ROWNTREE, L. G. Rehabilitation and Prehabilitation. J.A.M.A. 119, 15:1171 (Aug. 8), 1942.

Spasm and Muscle Alienation—Clearly described nursing details in the application of the Kenny method of care during the acute stages of poliomyelitis will prove illuminating to any health worker who wants to know what all the shooting is about in this revolutionary change in treatment.

STEVENSON, J. The Kenny Method. Am. J. Nurs. 42, 8:904 (Aug.), 1942.

Syphilis in National Unfitness—Of the first million draftees 45,000 had seriologic evidence of syphilis. The

second million will probably repeat the record. (We don't know the rates as of 1917—tests in those days were too new and expensive, and not used in the draft examination.) Only about half the discovered cases are being brought under treatment. Tolerated prostitution and failure to apply epidemiologic methods are tragically evident deficiencies in our warfare against this disease.

VONDERLEHR, R. A. The Impact of the War on the Venereal-Disease Problem. New Eng. J. Med. 227, 6:203 (Aug. 6), 1942.

BOOKS RECEIVED

MICROBIOLOGY AND MAN. By Jorgen Birkeland. New York: Crofts, 1942. 478 pp. Price, $4.00.

PHYSIOLOGICAL HYGIENE. By Cleveland Pendleton Hickman. rev. ed. New York: Prentice-Hall, 1942. 482 pp. Price, $3.25.

WAR MEDICINE. A Symposium. Winfield Scott Pugh, Editor. New York: Philosophical Library, 1942. 565 pp. Price, $7.50.

THE FAMILY IN A WORLD AT WAR. Edited by Sidonie Matsner Gruenberg. New York: Harper, 1942. 298 pp. Price, $2.50.

CIVILIAN HEALTH IN WARTIME. By Francis R. Dieuaide. Cambridge: Harvard University Press, 1942. 328 pp. Price, $2.50.

EMERGENCY CARE. By Marie A. Wooders and Donald A. Curtis. Philadelphia: Davis, 1942. 560 pp. Price, $3.50.

PSYCHOLOGY IN NURSING PRACTICE. By Philip L. Harriman, Lela J. Greenwood and Edward Skinner. New York: Macmillan, 1942. 483 pp. Price, $3.25.

WHY WE HAVE AUTOMOBILE ACCIDENTS. By Harry R. De Silva. New York: Wiley, 1942. 394 pp. Price, $4.00.

TERMINOLOGY AND DEFINITIONS OF SPEECH DEFECTS. By Mardel Ogilvie. New York: Bureau of Publications, Teachers College, 1942. 312 pp. Price, $3.50.

CHEMISTRY OF INSECTICIDES AND FUNGICIDES. By Donald E. H. Frear. New York: Van Nostrand, 1942. 300 pp. Price, $4.00.

BONNIE'S BABY BROTHER AND HOW HE GREW. By Elizabeth Rider Montgomery. New York: Stokes, 1942. 95 pp. Price, $2.00.

MICROBIOLOGY OF MEATS. By L. B. Jensen. Champaign: Garrard Press, 1942. 252 pp. Price, $4.00.

THE PHARMACOPOEIA OF THE UNITED STATES OF AMERICA. Twelfth Revision. Easton: Mack Printing Co., 1942. 880 pp. Price, $7.50.

HOSPITAL DISCHARGE STUDY. By Neva R. Deardorff and Marta Fraenkel. Vol. I. New York: Welfare Council of New York City, 1942. 209 pp. Price, $1.00.

THE MEAT YOU EAT. Report of the New York State Trichinosis Commission, Legislative Document No. 35, 1942. Newburgh: New York State Trichinosis Commission, 1942. 141 pp.

CLINICAL THERMOMETERS. 3rd ed. Commercial Standard Cs1–42. Washington: Government Printing Office, 1942. Price, $.10.

LEAGUE OF NATIONS. Report of the League 1941–1942 submitted by the Acting Secretary-General. 94 pp. Geneva: Publications Department of the League of Nations, 1942.

THE MENTALLY ILL AND PUBLIC PROVISION FOR THEIR CARE IN ILLINOIS. By Stuart K. Jaffary. Chicago: University of Chicago Press, 1942. 214 pp. Price, $1.25.

YOUTH LOOKS AT SCIENCE AND WAR. New York: Penguin Books, 1942. 133 pp. Price, $.25.

FIRST AID. POPULAR. By Fritz Kahn. New York: Krause, 1942. 56 pp. Price, $.60.

FIRST AID. SURGICAL AND MEDICAL. By Warren H. Cole, Charles B. Puestow and 17 Other Medical Authorities. New York: Appleton-Century, 1942. 374 pp. Price, $3.00.

A HANDBOOK OF ALLERGY FOR STUDENTS AND PRACTITIONERS. By Wyndham B. Blanton. Springfield: Thomas, 1942. 190 pp. Price, $3.00.

ASSOCIATION NEWS

SEVENTY-FIRST ANNUAL MEETING

ST. LOUIS, MO., OCTOBER 27–30, 1942

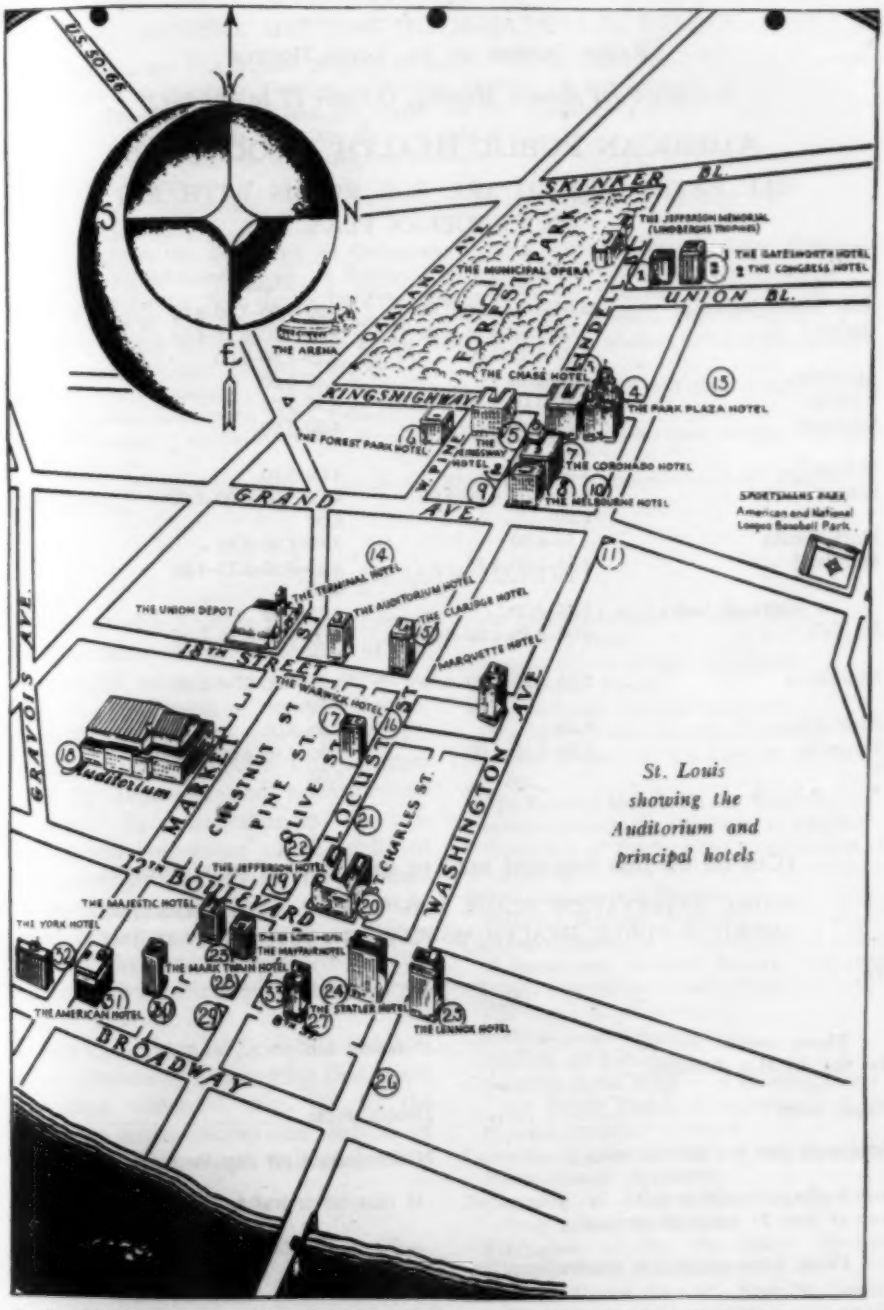
Meeting Headquarters: Auditorium

Residence Headquarters: Hotels Jefferson and Statler

RAILROAD FARES FROM VARIOUS POINTS TO ST. LOUIS, MO.

American Public Health Association
October 27–30, 1942

From	*One-way for Pullman Travel*	*Round-trip for Pullman Travel*	*One-way Lower Berth*	*One-way Upper Berth*
Atlanta, Ga.	$20.80	$31.20	$5.25	4.00
Baltimore, Md.	29.65	53.55	6.95	4.80
Boston, Mass.	40.10	72.20	9.25	6.40
Buffalo, N. Y.	23.70	43.80	5.80	4.40
Chicago, Ill.	9.65	14.45	2.95	2.20
Cleveland, Ohio	17.60	33.20	4.35	3.30
Dallas, Tex.	22.00	33.05	6.40	4.90
Denver, Colo.	30.05	45.10	7.90	5.95
Duluth, Minn.	23.95	35.95	6.40	4.90
Fort Worth, Tex.	22.45	33.65	6.40	4.90
Indianapolis, Ind.	8.20	16.05	2.95	2.00
Jacksonville, Fla.	31.10	46.65	8.10	6.20
Kansas City, Mo.	9.20	13.80	2.95	2.20
Louisville, Ky.	9.40	14.10	2.95	2.00
Los Angeles, Calif.	67.10	94.15	17.35	13.20
Memphis, Tenn.	10.25	15.40	2.95	2.20
Milwaukee, Wis.	12.45	18.65	3.50	2.65
Minneapolis, Minn.	19.30	28.95	4.35	3.30
Nashville, Tenn.	11.20	16.80	2.95	2.20
New Orleans, La.	25.60	38.45	6.80	5.15
New York, N. Y.	34.85	62.80	8.45	5.80
Omaha, Nebr.	13.85	20.80	3.50	2.65
Philadelphia, Pa.	31.90	57.40	7.85	5.40
Pittsburgh, Pa.	20.40	38.10	4.95	3.45
Portland, Ore.	72.10	94.15	17.35	13.20
Salt Lake City, Utah	46.30	64.70	11.90	9.05
San Francisco, Calif.	67.10	94.15	17.35	13.20
Seattle, Wash.	72.95	94.15	17.35	13.20
Washington, D. C.	29.65	53.55	6.95	4.80
Montreal, Que.	37.55	67.05	9.25	6.40
Halifax, N. S.	65.20	91.60	17.35	13.20
Ottawa, Ont.	34.25	61.60	8.45	5.80
Quebec, P. Q.	43.80	78.20	9.25	6.40
Toronto, Ont.	24.90	44.30	5.80	4.40
Vancouver, B. C.	72.95	94.15	17.35	13.20



St. Louis showing the Auditorium and principal hotels

American Hotel	31	Gatesworth Hotel	1	St. Louis University	9
Bishop Tuttle Memorial	19	Jefferson Hotel	20	Scruggs-Vandervoort-Barney	28
Board of Education	33	Kingsway Hotel	5	Sheldon Memorial	10
Chase Hotel	3	Lennox Hotel	25	Statler Hotel	24
Claridge Hotel	15	Mark Twain Hotel	30	Stix, Baer & Fuller	26
Congress Hotel	2	Mayfair Hotel	27	Third Baptist Church	11
Coronado Hotel	7	Melbourne Hotel	8	Vashon High School (Negro)	14
DeSoto Hotel	23	Municipal Auditorium	18	Warwick Hotel	17
Elks Club	12	Park Plaza Hotel	4	Y.M.C.A.	16
Famous-Barr	29	Public Library	22	York Hotel	32
Forest Park Hotel	6	Roosevelt Hotel	13	Y.W.C.A.	21

RATES QUOTED BY ST. LOUIS HOTELS

Seventy-First Annual Meeting, October 27 to 30, 1942

AMERICAN PUBLIC HEALTH ASSOCIATION

ALL RATES QUOTED ARE FOR ROOMS WITH BATH
ON EUROPEAN PLAN

Hotel	*Single*	*Double*	*Suites*
New Hotel Jefferson	$3.00–5.00–6.00–7.00	$6.00–7.00–7.50–8.00	$12.00–20.00
Statler	3.00–3.50–3.75–4.00 4.25–4.75–5.00	5.25–6.00–6.25–6.50 6.75–7.00–9.00	17.00–18.00
American	2.00–2.50	3.50–4.00	
Claridge	2.50–3.00	3.50–7.00	
Coronado	2.25 (shower) 2.75	4.50–5.00	6.00
DeSoto	2.65–up	4.00–5.00	8.00
Lennox	3.50–4.00–4.50–5.00 6.00	4.50–5.00–6.00–7.00 8.00	10.50–14.50
Mark Twain	2.50–4.00	3.50–5.00–5.50	
Maryland	2.25–2.50–2.75	3.25–3.50–3.75–4.00 4.50	
(without bath)	1.75–2.00	2.75–3.00	
Mayfair	3.00–3.50–4.00–5.00	4.00–4.50–5.50–6.00 7.00	
Melbourne	2.65–3.20–3.70–4.20	4.20–4.80–5.30–5.80 6.20	
Park Plaza	4.50	6.00–8.00	12.00–18.00
Warwick	2.00–2.50–3.00	3.00–3.50–4.00–4.50 5.00	7.00–10.00

.....(Cut off on this line and mail to the hotel of your choice).....

HOTEL RESERVATION BLANK FOR THE ST. LOUIS MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION, OCTOBER 27–30, 1942

To .....
(Name of Hotel)

Please reserve for me ..... rooms for ..... persons for the A.P.H.A. Meeting.

Single room ..... Double room .....

Maximum rate per day for room $..... Minimum rate per day for room $.....

I expect to arrive ..... If date of arrival is changed I will notify you at least 24 hours in advance.

Please acknowledge this reservation.

Name .....

Street Address.....

City..... State.....

ANNUAL MEETING INFORMATION IN REVIEW

TIME AND PLACE: 71st Annual Meeting, October 27–30, St. Louis, Mo. Meetings of related organizations, Saturday, October 24, Sunday, October 25, and Monday, October 26.

HOTELS: The New Jefferson and the Statler are the headquarters hotels. Their rates, and rates of other St. Louis hotels are given on page 1184.

MEETING: The Auditorium is meeting headquarters.

EXHIBITS: Auditorium.

REGISTRATION: Auditorium. Registration opens Sunday, October 25, at 8:30 A.M.

ADVANCE REGISTRATION:

Required for the Conference on Orthopedic Nursing, sponsored by the Joint Orthopedic Nursing Advisory Service, on Sunday, October 25, and Monday, October 26.

Required for the Eye Health Institute, sponsored by the National Society for the Prevention of Blindness, Inc., on Sunday, October 25, and Monday, October 26.

Urged for the Ninth Institute on Public Health Education, Sunday, October 25, Monday, October 26, and Tuesday, October 27.

PRELIMINARY PROGRAM: Published in the August *Journal*, pages 890–920. Supplementary information, September, pages 1066–1067.

FINAL PROGRAM: Available at the Registration Desk, Auditorium, from Sunday morning, October 25.

LOCAL COMMITTEE CHAIRMAN: Joseph F. Bredeck, M.D., Commissioner of Health, St. Louis, Mo.

THE HEALTH EXHIBIT

THE Health Exhibit held in connection with Annual Meetings of the Association conveys as much information, in the opinion of many delegates, as does the scientific program. At St. Louis, nearly 200 booths will be occupied by technical and scientific exhibitors. In most instances, the materials and equipment to be exhibited play some part in solving the problems of the emergency. A list of the technical exhibitors is published on page XXX of this issue. A complete description of each exhibit was published in the August *Journal*.

The Committee on Scientific Exhibits takes pleasure in announcing that space has been allocated thus far to the following organizations on behalf of exhibits on the subjects indicated:

Agricultural Marketing Administration
The School Lunch Program

American Bureau for Medical Aid to China, Inc.
China's Health in War

American Dental Association
Preventive Dentistry

American Medical Association
Health Education in the Doctor's Office
Dietary Deficiency Diseases
An Industrial Health Program for a County Medical Society

American School Health Association
Information Booth

American Social Hygiene Association
The Minor Genito-Infectious Diseases

American Society for the Control of Cancer, Inc.
The Value of Mice in Cancer Research

American Society for the Hard of Hearing
Prevention of Deafness and Conservation of Hearing

British Information Services
Britain's Wartime Nutrition

Children's Bureau, U. S. Department of Labor
Maternal and Neonatal Deaths, 1930–1940

Cincinnati Municipal Health Center
Planning a Health Center

Cleveland Health Museum
Exhibits on a Budget

Committee on the Hygiene of Housing, American Public Health Association
Housing Survey Procedures

Committee on Local Health Units, American Public Health Association

Department of Medical Genetics, Bowman Gray School of Medicine
Prevention of the Hereditary Diseases Which Wreck Childhood

East Side Health District, East St. Louis, Illinois
Activities of the East Side Health District

Farm Security Administration
Health Is Vital to War Food Production

Health Department of the City of St. Louis

Activities of the Health Department
Hospital Division of the City of St. Louis
Activities of the Hospital Division
Iowa State Department of Health
Brucellosis
Medical Division, Office of Civilian Defense
Medical Aspects of Chemical Warfare in Civilian Protection
Emergency Medical Service for Civilian Defense
Metropolitan Life Insurance Company
Health Progress and American Man Power
National Leprosarium
Leprosy. Clinical Types and Roentgenograms
National Organization for Public Health Nursing
Information Booth
National Society for the Prevention of Blindness
Some Wartime Eye Problems
New York State Health Department
Home and Farm Safety
St. Louis Society for Crippled Children
Facilities for Crippled Children in the St. Louis Area
St. Louis University School of Dentistry
Pathology of Diseases of Jaws and Teeth with Reference to Public Health Problems
St. Louis University School of Nursing
Venereal Disease and Industrial Nursing
Shriners' Hospitals for Crippled Children, St. Louis Unit
Treatment and Apparatus Used for Crippled Children
Squibb Institute for Medical Research
Lymphogranuloma Venereum
Subcommittee on Nursing, Office of Defense Health and Welfare Services
America at War Needs Nurses
U. S. Public Health Service
Two Million Selectees Blood Tested for Syphilis
Care vs. Caries, from Boyhood to Soldier
Aircraft Quarantine
35 mm. Photofluorographic X-ray Units

HEALTH EDUCATION CENTER

ACCORDING to the Social Work Publicity Council, material is coming from all over the country for the display of health education specimens to be shown during the Health Education Institute and the Annual Meeting in St. Louis. The collection will be housed in the Health Education Center in the Auditorium, which the Publicity Council is conducting again this year for the Association. Portfolios, annual reports, booklets, bulletins, pictorial statistics, radio scripts, newspaper publicity, posters, and other public education media will be available for study. All the portfolios are being planned to bring the most useful ideas and information to health educators in the war period.

A special feature of the Health Education Center will be a consultation service open to those enrolled in the Health Education Institute. Monday morning, when there are only two scheduled round tables on the Institute program, has been designated as "consultation period." There will be limited opportunity for delegates who do not attend the Institute to make appointments with the consultants at the Center at other times during the week.

The preliminary roster of consultants on your health education problems includes: Mary P. Connolly, Department of Health, Detroit; Mayhew Derryberry, Ph.D., National Institute of Health, Bethesda, Md.; Bruno Gebhard, M.D., Cleveland Health Museum; Ruth E. Grout, Ph.D., U. S. Office of Education, Washington, D. C.; Ira V. Hiscock, Sc.D., Yale University School of Medicine, New Haven; Marion McKinney, Department of Health, Health Education Service, White Plains, N. Y.; Lucy Morgan, Ph.D., Craven County Health Department, New Bern, N. C.; Delbert Obertueffer, Ph.D., Professor of Physical Education, Ohio State University; Edward A. Pool, Zurich Insurance Company, Chicago; C. E. Turner, Dr.P.H., Massachusetts Institute of Technology, Department of Public Health.

JOURNAL EXPANDS EDITORIAL STAFF

THE Editorial Board of the *American Journal of Public Health*, with the approval of the Executive Board of the Association, has announced the appointment, effective September 1, of two additional Associate Editors, namely, Martin Frobisher, Jr., Sc.D., of the Johns Hopkins School of Hygiene and Public Health, Baltimore, Editor of the *American Journal of Hygiene;* and James E. Perkins, M.D., Dr.P.H., Assistant Commissioner, New York State Department of Health, Albany. Leona Baumgartner, M.D., Ph.D., Director of the Division of Child Hygiene, New York City Department of Health, and Arthur P. Miller, C.E., U. S. Public Health Service, New York City, will continue to serve as Associate Editors.

The Editorial Board has announced that the circulation has reached an all-time high of 9,400 copies for the *Journal*.

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Eligibility, and the Governing Council will take place at the St. Louis Annual Meeting.

Health Officers Section

Charles G. Baker, M.D., Assistant Health Officer and Venereal Disease Control Officer, Fayette County Health Dept., Lexington, Ky.

Arthur L. Barbakoff, M.D., M.S.P.H., Director, Lee County Defense Health Unit, Freeport, Ill.

Dwight M. Bissell, M.D., M.S.P.H., Health Officer, San Jose, Calif.

Monroe F. Brown, M.D., M.P.H., Director of Local Health Service, State Department of Health, Nashville, Tenn.

W. D. Burkhalter, M.D., M.P.H., Assistant Health Officer, Memphis and Shelby County Health Departments, Memphis, Tenn.

Jose Chaves, M.D., Director, Public Health Units, Puerto Rico Health Department, Santurce, P. R.

Robert C. Farrier, M.D., Director, East Side Health District, East St. Louis, Ill.

Lawrence W. Fitzmaurice, M.D., D.P.H., Chairman, Board of Health, Nassau, Bahamas, B.W.I.

Edward J. Godfrey, M.D., Health Officer, Waterbury, Conn.

James T. Googe, M.D., C.P.H., Senior Medical Officer, Farm Security Administration, Denver, Colo.

Donald M. Harris, M.D., M.S.P.H., District Medical Director, State Health Department, Spencer, Iowa

John M. Hooper, M.D., M.P.H., Venereal Disease Control Officer, U. S. Army Medical Corps, McKinney, Tex.

Hugo V. Hullerman, M.D., M.S.P.H., Deputy Commissioner of Health, Peoria, Ill.

Rutherford O. Ingham, M.D., M.P.H., Health Officer, Washington County Health Department, Jonesboro, Ala.

Lorin E. Kerr, Jr., M.D., M.S.P.H., Health Commissioner, Lorain County Health Department, Oberlin, Ohio

Leon R. Kramer, D.D.S., M.S.P.H., Director, Division of Dental Hygiene, State Board of Health, Topeka, Kans.

Charles J. Larkey, M.D., Health Officer, Bayonne, N. J.

Ezequiel Martinez-Rivera, M.D., M.Sc.P.H., Assistant Director, Bureau of Health Units, Department of Health, Hato Rey, P. R.

Sumner M. Miller, M.D., Commissioner of Health, Peoria, Ill.

George F. Moench, M.D., M.Sc.P.H., County Health Director, Calhoun County Health Department (W. K. Kellogg Foundation), Marshall, Mich.

John C. Neale, Jr., M.D., C.P.H., Assistant Director, Rural Health, State Department of Health, Norfolk, Va.

Jerome S. Peterson, M.D., M.P.H., District Health Officer, Department of Health, New York, N. Y.

John J. Poutas, M.D., M.P.H., Assistant to the Commissioner, State Department of Public Health, Boston, Mass.

Erwin C. Sage, M.D., M.P.H., Director, Des Moines County Health Service, Burlington, Iowa

James P. Sharon, M.D., M.P.H., Director of Venereal Diseases, State Department of Health, Lincoln, Nebr.

Jerome J. Sievers, M.D., M.S.P.H., District Health Superintendent, State Department of Public Health, Springfield, Ill.

Courtney Smith, M.D., Dr.P.H., Assistant Commissioner of Health, Territory of Alaska, Juneau, Alaska

Charles A. Steurer, M.D., Director, Division of Communicable Diseases, Nassau County Department of Health, Mineola, L. I., N. Y.

Harry Wain, M.D., M.S.P.H., Health Commissioner, Sidney and Shelby County, Sidney, Ohio

James P. Ward, M.D., M.P.H., Director, Washington County Health Department, Greenville, Miss.

Laboratory Section

L. A. Barnes, Ph.D., Lieutenant, Epidemiology and Sanitation, U. S. Navy Medical School, Bethesda, Md.

Stanhope Bayne-Jones, M.D., Lieutenant Colonel, U. S. Army Medical Corps, New Haven, Conn.

Walter J. Beichert, M.D., Bacteriologist and Chemist, Lindsay Laboratories, Brooklyn, N. Y.

George D. Brigham, Ph.D., Officer in Charge, Typhus Research Laboratory, U. S. Public Health Service, Savannah, Ga.

Claude P. Brown, M.D., Assistant Director, State Department of Health Laboratories, Philadelphia, Pa.

Elizabeth C. Brown, M.S., Serologist, State Department of Health, St. Louis, Mo. (On leave of absence)

William D. Dotterrer, B.S., Director of Laboratories, Bowman Dairy Company, Chicago, Ill.

Lloyd D. Felton, M.D., D.Sc., Senior Surgeon, U. S. Public Health Service, Washington, D. C.

Earl W. Flosdorf, Ph.D., Assistant Professor of Bacteriology, University of Pennsylvania, Philadelphia, Pa.

Jules Freund, M.D., C.P.H., Assistant Director, Bureau of Laboratories, New York City Health Department, Otisville, N. Y.

Elizabeth F. Genung, M.S.A., Associate Professor of Bacteriology, Smith College, Northampton, Mass.

Albert H. Harris, M.D., Bacteriologist, Division of Laboratories and Research, State Health Department, Albany, N. Y.

Margaret R. Harrison, M.A., Chemist, U. S. Public Health Service, U. S. Marine Hospital, Staten Island, N. Y.

J. V. Irons, Sc.D., Associate Director of Laboratories, State Department of Health, Austin, Tex.

Gerard Laviano, M.D., Owner and Director, Woodside Medical Laboratory, Woodside, L. I., N. Y.

Elizabeth Maltaner, B.S., Associate Bacteriologist, Division of Laboratories and Research, State Health Department, Albany, N. Y.

John J. Miller, Jr., M.D., Assistant Professor in Pediatrics, Stanford University, San Francisco, Calif.

Lucy Mishulow, B.A., Senior Bacteriologist, Department of Health, New York, N. Y.

Thomas M. Rivers, M.D., Sc.D., Director of Hospital, Rockefeller Institute for Medical Research, New York, N. Y.

Elizabeth D. Robinton, M.A., Senior Microbiologist, State Department of Health, Hartford, Conn.

Paul F. Russell, M.D., M.P.H., Lieutenant Colonel, Division of Epidemiology, Preventive Medicine Section, Office of Surgeon General, U. S. Army, Washington, D. C.

Louis W. Sauer, M.D., Ph.D., Assistant Professor of Pediatrics, Northwestern University Medical School, Evanston, Ill.

Wheelan D. Sutliff, M.D., Assistant Director, Bureau of Laboratories, Department of Health, New York, N. Y.

William H. Taliaferro, Ph.D., Chairman, Department of Bacteriology and Parasitology, University of Chicago, Chicago, Ill.

Vital Statistics Section

Billy Tober, State Registrar of Vital Statistics and Supervisor of Finance, State Department of Health, Santa Fe, N. M.

Engineering Section

Seth G. Hess, C.E., Chief Engineer and Executive Secretary, Interstate Sanitation Commission, New York, N. Y.

William T. Ingram, A.B. in C.E., Sanitary Engineer, San Joaquin Local Health District, Stockton, Calif.

John E. Kiker, Jr., M.C.E., District Sanitary Engineer, State Department of Health, Poughkeepsie, N. Y.

Paul F. Krueger, B.S., Chief Sanitary Officer, Department of Health, Chicago, Ill.

George O. Pierce, M.S., C.P.H., Assistant Professor, Department of Preventive Medicine and Public Health, University of Minnesota, Minneapolis, Minn.

Blucher A. Poole, B.S.C.E., Chief Engineer, State Board of Health, Indianapolis, Ind.

Carl E. Schwob, M.S. in S. E., Principal Sanitary Engineer, State Department of Public Health, Chicago, Ill.

Industrial Hygiene Section

James M. Carlisle, M.D., Medical Director, Merck & Co., Inc., Westfield, N. J.

Roye W. Franks, Ch.E., Industrial Hygiene Officer, U. S. Army (Chemical Warfare), Edgewood Arsenal, Md.

Gordon C. Harrold, Ph.D., Industrial Hygienist, Chrysler Corporation, Detroit, Mich.

Edward C. Holmblad, M.D., Consulting Industrial Surgeon, and Local Medical Officer, Eastman Kodak Co., Chicago, Ill.

Fred R. Ingram, M.S., Supervising Public Health Engineer, State Department of Public Health, Berkeley, Calif.

Milton H. Kronenberg, M.D., Chief, Division of Industrial Hygiene, State Department of Public Health, Chicago, Ill.

Carl M. Peterson, M.D., Secretary, Council on Industrial Health, American Medical Association, Chicago, Ill.

Harold W. Slocum, A.B., Executive Secretary, Vermont Tuberculosis Association and Director, Tuberculosis Division, State Department of Health, Burlington, Vt.

Marion F. Trice, B.S., Industrial Hygiene Engineer, State Board of Health, Raleigh, N. C.

William N. Witheridge, M.S., Chief, Bureau of Industrial Hygiene, Health Department, Detroit, Mich.

Food and Nutrition Section

H. D. Kruse, M.D., Sc.D., Staff Member, Milbank Memorial Fund, New York, N. Y.

Alice H. Smith, M.S., Nutritionist, Cleveland Health Council, Cleveland, Ohio

Maternal and Child Health Section

Florence A. Browne, M.D., M.S.P.H., Director, Bureau of Maternal and Child Health, Board of Health, Hartford, Conn.

Marcia Hays, M.D., Dr.P.H., Associate in Maternal and Child Health, U. S. Children's Bureau, San Francisco, Calif.

Marion Hotopp, M.D., M.P.H., Acting Director, Division of Maternal and Child Health, State Department of Health, Dover, Del.

Roland H. Loder, M.D., Director, Division of Maternal and Child Health, State Department of Health, Lincoln, Nebr.

Hilla Sheriff, M.D., M.P.H., Director, Maternal and Child Health Division, State Health Department, Columbia, S. C.

Myron E. Wegman, M.D., M.P.H., Director, Training and Research in Maternal and Child Health, Department of Health, New York, N. Y.

Public Health Education Section

Alfred J. Asgis, D.D.S., Ph.D., Assistant Professor of Oral Surgery and Lecturer on Orientation in Dentistry & Public Health, New York University College of Dentistry, New York, N. Y.

Gordon A. Bates, M.B., General Director, Health League of Canada, Toronto, Ont., Canada

Leona de Mare East, A.B., Chief, Division of Public Health Instruction, State Department of Public Health, Springfield, Ill.

Fanchon Hart, A.M., Associate Professor of Botany and Bacteriology, College of Pharmacy, Columbia University, New York, N. Y.

Charles E. Lyght, M.D., C.M., Professor of Health and Physical Education and Director, College Health Service, Carleton College, Northfield, Minn.

Kathryn Maxwell, B.S., R.N., Nurse Supervisor, Health Education Division, Department of Health, Detroit, Mich.

J. Louis Neff, Executive Secretary, Nassau County Medical Society, and Secretary, Nassau County Cancer Committee, Mineola, L. I., N. Y.

Public Health Nursing Section

Mary Beard, R.N., Director, Nursing Service, American Red Cross, Washington, D. C.

Ann Dickie Boyd, R.N., B.A., Supervisor of Nurses, Denver Public Schools, Denver, Colo.

Helene B. Buker, M.A., R.N., Director, Bureau of Public Health Nursing, State Department of Health, Lansing, Mich.

Dorothy J. Carter, A.B., R.N., General Director, Community Health Association, Boston, Mass.

Mary C. Connor, R.N., M.A., Assistant Director and Educational Secretary, National Organization for Public Health Nursing, New York, N. Y.

Frances R. Kahl, B.A., R.N., Public Health Nursing Consultant, U. S. Public Health Service, Denver, Colo.

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Mellie F. Palmer, R.N., C.P.H., Assistant Professor, University of Minnesota, Minneapolis, Minn.

Josephine P. Prescott, A.M., Director, Bureau of Public Health Nursing, Health Department, Washington, D. C.

Epidemiology Section

Wendell R. Ames, M.D., M.P.H., Commissioner of Health, Cattaraugus County Health Department, Olean, N. Y.

Paul W. Auston, M.D., Director, Tuberculosis Control, East Alabama Health District, Opelika, Ala.

Alfred L. Burgdorf, M.D., M.P.H., Health Officer, Hartford, Conn.

Francis B. Carroll, M.D., M.P.H., Preventive Medicine Section, Surgeon General's Office, War Department, Washington, D. C.

E. Gurney Clark, M.D., M.P.H., Associate in Venereal Diseases, Johns Hopkins School of Hygiene and Public Health and Physician in Charge of Syphilis Clinic, Johns Hopkins Hospital, Baltimore, Md.

Nicholas P. Cosco, M.D., Health Officer, Middletown, N. Y.

John A. Cowan, M.D., M.S.P.H., Director, District Health Service No. 4, Sioux City, Iowa

Dorland J. Davis, M.D., Dr.P.H., P. A. Surgeon, National Institute of Health, Bethesda, Md.

Jean Downes, M.A., Staff Member, Milbank Memorial Fund, New York, N. Y.

Thomas D. Dublin, M.D., Dr.P.H., Instructor in Preventive Medicine and Public Health, Albany Medical College, and Epidemiologist, State Health Department, Albany, N. Y.

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Vlado A. Getting, M.D., Dr.P.H., Health Commissioner, Worcester, Mass.

Alexander G. Gilliam, M.D., Dr.P.H., Assistant Surgeon, U. S. Public Health Service, Bethesda, Md.

Herman E. Hilleboe, M.D., M.P.H., P. A. Surgeon-in-Charge Tuberculosis Control, U. S. Public Health Service, Washington, D. C.

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Alvin E. Keller, M.D., Associate Professor, Department of Preventive Medicine and Public Health, Vanderbilt University, Nashville, Tenn.

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James H. Lade, M.D., Assistant Director, Division of Syphilis Control, State Department of Health, Albany, N. Y.

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George M. Leiby, M.D., Dr.P.H., Chief, Division of Preventive Medicine, State Board of Health, New Orleans, La.

Morton L. Levin, M.D., Dr.P.H., Assistant Director, Division of Cancer Control, State Department of Health, Albany, N. Y.

Atilio Macchiavello, M.D., Dr.P.H., Director, Ecuadorian Public Health Service, Guayaquil, Ecuador

Basil C. MacLean, M.D., M.P.H., Director, Strong Memorial Hospital, University of Rochester, Rochester, N. Y.

J. A. Myers, M.D., Ph.D., Professor of Public Health and Preventive Medicine, University of Minnesota School of Medicine, Minneapolis, Minn.

Arthur W. Newitt, M.D., M.P.H., Director, Bureau of Local Health Service, State Board of Health, Jacksonville, Fla.

John J. Phair, M.D., Dr.P.H., Associate in Epidemiology, Johns Hopkins School of Hygiene and Public Health, Baltimore, Md.

David D. Rutstein, M.D., Consultant in the Medical Aspects of Chemical Warfare, U. S. Public Health Service, Washington, D. C.

Irvin W. Sander, M.D., Dr.P.H., Professor of Preventive Medicine and Public Health and Director, Student Health Service, Wayne University, Detroit, Mich.

Philip E. Sartwell, M.D., M.P.H., Assistant Director, Division of Tuberculosis, State Department of Health, Boston, Mass.

James J. Siragusa, M.D., M.P.H., Health Officer in charge of Health Unit, Health Department, Boston, Mass.

Stafford M. Wheeler, M.D., Lieutenant, Junior Grade, U. S. Navy Medical Corps, Bethesda, Md.

Unaffiliated

Joseph M. Curry, V.S., B.V.Sc. (Lieutenant Colonel, U. S. Army), Station Veterinarian, Keesler Field, Miss.

Rolla E. Dyer, M.D., Director, National Institute of Health, Bethesda, Md.

Anthony G. Featherston, M.D., M.S.P.H., Administrator, Philadelphia Health Center, Philadelphia, Pa.

Carlos E. Finlay, M.D., formerly Director of Public Health, Havana, Cuba

John G. Grant, M.D., Head, Department of Hygiene and Director, Student Health Service, Iowa State College, Ames, Iowa

G. Hill Hodel, M.D., Chief, Division of Social Hygiene, Los Angeles County Health Department, Los Angeles, Calif.

Anthony J. Lamberti, M.S., Instructor in Bacteriology, Villanova College, Philadelphia, Pa.

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Lester M. Petrie, M.D., M.P.H., Director,

Industrial Hygiene Service, State Department of Health, Atlanta, Ga.

Hildrus A. Poindexter, M.D., M.S.P.H., Professor and Head, Department of Bacteriology, Preventive Medicine and Public Health, Howard University, Washington, D. C.

Marion Yang, M.D., Senior Technical Expert, National Institute of Health, Chungking, China

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Lawrence Arnstein, B.S., 45 2nd St., San Francisco, Calif., Executive Secretary, California Social Hygiene Assn.

Maurice J. Ayres, M.D., County Health Officer, Tuscumbia, Mo., Miller County and State Health Dept.

Lawrence W. Kaufman, M.D., 4518 S. Howell Ave., Milwaukee, Wis., Health Officer, Town of Lake Health Dept.

Harvey A. Kelly, M.D., 200 Pleasant St., Winthrop, Mass., Member Advisory Committee, State Dept. of Public Health

Harry Lowens, M.D., Muskogee City-County Health Unit, Muskogee, Okla., Assistant Director

Frederick D. Mott, M.D., C.M., 5506 Wriley Rd., Washington, D. C., Chief Medical Officer, Farm Security Administration

J. M. Pickard, M.D., County Health Office, Court House, Dallas, Tex., Health Officer

Samuel S. Reinglass, M.D., M.P.H., 422 Second Ave., Dixon, Ill., Dist. Health Supt., State Dept. of Public Health

Frank W. Stewart, M.D., 209 City Hall, Long Beach, Calif., Asst. City Health Officer

Laboratory Section

Marjorie A. Bloom, B.A., Public Health Laboratory, Fargo, N. D., Bacteriologist

Louis R. Curtis, Ph.D., 2184 Oneida St., Salt Lake City, Utah, Chief Sanitarian, City Board of Health

Lieut. Wilbur E. Deacon, Army and Navy General Hospital, Hot Springs, Ark., Sanitary and Medical Bacteriologist

Harold Friedlander, M.A., 2105 N. 18th St., Arlington, Va., Asst. Bacteriologist, U. S. Dept. of Agriculture

William G. Garner, Mb.D., 329 Eccles Bldg., Ogden, Utah, City Bacteriologist and Technologist, City Health Dept.

Isaac F. Gratch, M.D., 1217 S. Broad St., Philadelphia, Pa., Associate in Preventive Medicine & Public Health at Hahnemann Medical College and Hospital

Aurelio A. Lopez, BS., M.T., Hospital Amador Guerrero, Colon, Panama, Director de Laboratorio

Albert Milzer, Ph.D., 2912 Ellis St., Chicago, Ill., Research Bacteriologist, Deutsch Serum Center, Michael Reese Hospital

Leo Moschkowitz, M.D., 134½ N. 10th St., Olean, N. Y., Pathologist and Director of Laboratories, Olean General Hospital

Ruth P. Parker, A.B., 354 Spruce St., San Francisco, Calif., Laboratory Technician, Childrens Hospital

Lloyd C. Shields, 1033 Gayley Ave., Los Angeles, Calif., Medical Laboratory Technician, Westwood Medical Laboratory

Janey G. Stanfield, Dept. of Health, Otisville, N. Y., Laboratory Asst., New York City Dept. of Health

Clara Will, M.S., State Laboratory of Hygiene, Raleigh, N. C., Bacteriologist

Vital Statistics Section

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Francis D. Rhoads, A.M., State Dept. of Health, Charleston, W. Va., Director, Div. of Vital Statistics

Mabel Tramp, B.S., 414 7th St., Bismarck, N. D., Statistician, State Dept. of Health

Engineering Section

Gilbert Groff, M.P.H., Box 56, Valley City, N. D., Dist. Engineer, State Health Dept.

Earl C. Huston, Cherokee County Health Unit, Columbus, Kan., Sanitarian

Lieut. Whitney E. Lawrence, Camp Dispensary, Camp Beauregard, La., Sanitary Corps, U. S. Army

George Loelkes, Rt. 5, Box 235, Springfield, Mo., Sanitary Engineer, City of Springfield

Samuel L. Resnick, B.S., County Health Dept., Camden, S. C., Junior Public Health Engineer, U. S. Public Health Service

Francis S. Weir, B.S., 1604 Smith Young Tower, San Antonio, Tex., Junior Public Health Engineer, U. S. Public Health Service

Industrial Hygiene Section

Harold T. Castberg, M.D., 2002 Acton St., Berkeley, Calif., Acting Chief, California Industrial Hygiene Service

Food and Nutrition Section

Edward Becker, 430 N. 16th St., Kansas City, Kan., Commissioner of Finance, Health and Public Property, Dept. of Health

Joseph Mahoney, 320 N. 13th St., Kansas City, Kan., Dairy Inspector, Dept. of Health

Jean P. Morris, M.A., 2101 Adelbert Rd., Cleveland, Ohio, Asst. Nutritionist, Cleveland Health Council

William A. Queen, B.A., 922 S. Washington St., Alexandria, Va., Chief, Div. of State Cooperation, Food and Drug Admin., Federal Security Agency

James F. Rinehart, M.D., Univ. of California Medical School, San Francisco, Calif., Board Member, State Dept. of Public Health

Maternal and Child Health Section

Nolan A. Owens, M.D., 1001 Irving St., N.W., Washington, D. C., Associate in Pediatrics, Health Dept.

Marguerite B. Richards, M.D., 1830 Flower St., Bakersfield, Calif., Asst. Director of Maternal and Child Health, Kern County Dept. of Health

Public Health Education Section

Gerald D. Fry, B.A., 411 N. 10th St., St. Louis, Mo., Director of Health Education, Mo. Tuberculosis Assn.

Katherine Hope, M.A., 5510 Cates Ave., St. Louis, Mo., Medical Social Worker, St. Louis Training School

Anne McCauley, R.N., Health Dept., Ripley, W. Va., Public Health Nurse, State Health Dept.

Public Health Nursing Section

Helen S. Austin, B.S., 1509 E. Wilson St., Glendale, Calif., Elementary School Nurse, Chico City Schools, Board of Education

Leah M. Barskey, R.N., Box 191, Dixon, Ill., Public Health Nurse, State Dept. of Health

Mildred M. Eslick, B.S., 1307 Pere Marquette Bldg., New Orleans, La., Asst. Public Health Nursing Consultant, U. S. Public Health Service

Anna E. Love, B.S., 3460 N. Pennsylvania St., Indianapolis, Ind., Public Health Nursing Consultant, State Board of Health

Minnie McEvoy, City Hall, 6th & Ann., Kansas City, Kan., Supervisor of Nurses, Health Dept.

Celia Moore, R.N., B.S., City-County Health Unit, Muskogee, Okla., Asst. Public Health Nursing Consultant

Mary E. Parker, R.N., M.S., State Dept. of Health, Cardiac Bureau, Albany, N. Y., Consultant Public Health Nurse

Henrietta Perlman, R.N., Isolation Hospital, Unit 21, Peru, Ill., Dist. Public Health Nurse, State Dept. of Public Health

Margaret E. Prunty, C.P.H., Gilmer County Health Dept., Glenville, W. Va., Public Health Nurse

Epidemiology Section

Beverly A. Benson, M.S.P.H., 2109 Peachtree Rd., Atlanta, Ga., Junior Laboratory Helper, Fourth Corps Area Laboratory

Dr. Samuel H. Castro, Fundidora de Monterrey No. 108–Col Industrial, Mexico, D. F.

Elvira M. DeLice, M.D., M.P.H., New York Univ., Medical College, 477 First Ave., New York, N. Y., Instructor, Dept. of Preventive Medicine

Sylvia S. Haven, A.B., 1235 Kapiolani Blvd., Honolulu, Hawaii, Bacteriologist and Executive Secretary, Medical Milk Commission

Paul E. Lyday, B.S., 8 Dale St., Asheville, N. C., Epidemiologist, Asheville City and Buncombe County Health Dept.

Gustavo G. Molina, M.D., M.P.H., Casilla 48, Santiago, Chile, S. A., Epidemiologist, Direccion General de Sanidad

Norman B. Nelson, M.D., Dr.P.H., 1726 N. Fuller St., Hollywood, Calif., Epidemiologist, Los Angeles City Health Dept.

Harold E. Pearson, M.D., M.P.H., School of Public Health, Univ. of Michigan, Ann Arbor Mich., Asst. Professor of Epidemiology

Unaffiliated

Harry J. Becker, M.A., 4932 Cordell Ave., Bethesda, Md., Consultant, Div. of Public Health Methods, U. S. Public Health Service

Harry M. Chester, M.A., Georgia Dept. of Public Health, 12 Capitol Square, S.W., Atlanta, Ga., Personnel Administrator

Felix R. Leycegui, D.D.S., Viena 26, Oficina de Especializacion Sanitaria, Mexico D. F., Mexico, Chief of Service, Dental Division, Public Health Dentistry

DECEASED MEMBERS

Emily M. Duntz, Geneva, N. Y., Elected Member 1941, Public Health Education Section

G. W. Luckey, M.D., Austin, Texas, Elected Member 1924, Health Officers Section

George M. Price, M.D., New York, N. Y., Elected Member 1912, Elected Fellow 1922, Industrial Hygiene Section

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

U. S. CIVIL SERVICE COMMISSION

The Commission has announced again its need for public health nursing consultants in war work. The new announcement now provides for 5 grades and for appointments in the Children's Bureau, Department of Labor, U. S. Public Health Service, and Federal Security Agency. Salaries range from $2,600 to $5,600 a year. No age limits have been set. Positions exist both in the United States and foreign countries. War service appointments will be made to extend generally for the duration of the war and no longer than 6 months afterward. Duties are to carry out, in accordance with the rank of the position, nursing or nursing education programs; and to act in advisory capacity to Federal agencies, or to State, County, and municipal organizations.

There will be no written test, qualifications being judged solely from review of experience, education, and training of applicants. Persons applying must have completed a 4 year course in a recognized college and 1 year's special program of study in public health nursing approved by the National Organization for Public Health Nursing; must also have graduated from an accredited school of nursing affiliated with a hospital having a daily average of 100 or more bed patients; be registered nurses in a state or territory of the United States or the District of Columbia, and have had appropriate general public health nursing supervisory experience. Additional credit given for completion of approved college course in statistical analysis, public health nursing, supervision, social hygiene, tuberculosis control and maternity, pediatric or orthopedic nursing; also for certain appropriate experience as instructor, consultant, or investigator.

For positions in Children's Bureau additional progressive experience in specialized fields of maternal or child health is required for the top grade and may be substituted for part of the general experience prescribed for the other grades.

Applications must be filed with the U. S. Civil Service Commission, Washington, D. C., and will be accepted until the needs of the service have been met. Forms may be obtained direct from the Commission or at any first or second class post office.

Merit System Council, Oregon State Board of Health and Crippled Children's Division, has announced merit examinations in practically all professional public health fields, including Health Officers, Nurses, Sanitary Engineers, Laboratory Workers, Vital Statisticians, Consultants in the fields of Health Education, Hearing and Vision, Nutrition, Oral Health and Physiotherapy. Two clerical positions, Fiscal Worker and Administrative Clerk are included in this list as is also the position of Merit System Personnel Technician.

Interested persons may get full particulars regarding the positions and examinations by writing H. J. Sears, Merit System Supervisor, P. O. Box 88, Portland, Ore.

The Indiana State Personnel Division, 141 South Meridian Street, Indianapolis, announces that applications may be filed at any time until further notice for the following positions:

Orthopedic Nursing Consultant I (women only)	$150–200 mo.
Physician I (General)	165–250 mo.
Physician II (General)	250–325 mo.
Physician II (Tuberculosis)	250–325 mo.
Physician I (Psychiatric)	185–265 mo.
Physician II (Psychiatric)	250–325 mo.
Local Public Health Director	300–360 mo.

POSITIONS AVAILABLE

Western state department of health will consider applications from physicians to fill four existing vacancies among county health officers, one vacancy in venereal disease control and positions as laboratory technicians. Write **Box S**, Employment Service, A.P.H.A.

Physician with either public health training or experience in local health de-

partment administration to serve as health director in a county or district health department in midwestern state. Salaries vary from $4,000 to $4,500 with $500 to $600 travel, flat rate. These are well established health departments. Write **Box T,** Employment Service, A.P.H.A.

County Public Health Nurses for New Mexico. Must have 4 months' postgraduate instruction under one of the recognized public health nursing courses and 1 year's experience. Must drive and have a car. Address inquiry to State Health Department, Santa Fe, N. M.

PUBLIC HEALTH ENGINEER

Responsible professional public health engineering involving field investigations and office studies in the application of sanitary measures. The more difficult engineering and sanitation field surveys include supervision over public water supplies, sewerage systems and sewage treatment plants and review of plans for same, and promotion and supervision of sanitation programs. Minimum qualifications: Training and experience equivalent to 3 years' civil engineering experience, including 2 years in public health or sanitary engineering; *or* completion of an academic year of graduate study and a year's experience in sanitary or public health engineering; *and* graduation from a college of recognized standing with a major course in civil or sanitary engineering. The salary range is $205 to $250 per month depending upon experience. Apply **Box E,** Employment Service, A.P.H.A.

THE AMERICAN RED CROSS NEEDS EDUCATORS

The American Red Cross will employ hundreds of social welfare workers and educators before January, 1943. These new employees will perform Red Cross services to the military units both in this country and with the task forces abroad.

Red Cross workers give counsel to the men in the armed forces about their personal and family problems, plan and organize recreational activities. They interpret Red Cross service to the military authorities. They act, to quote U. S. Army regulations, "in matters of voluntary relief and in accord with the military and naval authorities as a medium of communication between the people of the United States of America and their Army and Navy."

New professional employees needed include:

Men—Field directors, to serve at the military and naval centers here and abroad to counsel and advise men in the service regarding personal and family problems.

Men and Women—Club directors, program directors, staff assistants to operate clubs in leave areas overseas, some who qualify through executive or administrative experience, others by experience comparable to the operation of a large community center, and still others who qualify through recreation training and experience.

Men—Assistant field directors for recreation, to serve with the task forces overseas, qualified to plan, organize, and promote recreational activities such as sports, games, social recreation, entertainments, arts and crafts, music, dramatics, and game rooms.

Women—Medical and psychiatric social workers, case workers and recreation specialists in military and naval hospitals both here and abroad.

Men and women assigned to the service in this country will receive from $135 to $200 per month; those stationed outside the United States receive from $150 to $275 plus an additional $50 per month maintenance allowance in military centers and full maintenance in club work. Uniforms are provided. Those Assigned abroad are also provided with certain insurance protection.

Those interested in receiving further information or in making application for a position in the American Red Cross Services to the Armed Forces program should communicate with: Personnel Service, National Headquarters, American Red Cross, Washington, D. C.

Those interested in a position within continental United States only should apply to the nearest Red Cross area office. They are as follows:

North Atlantic Area, 300 Fourth Avenue, New York, N. Y.
Eastern Area, 615 N. St. Asaph Street, Alexandria, Va.
Midwestern Area, 1709 Washington Avenue, St. Louis, Mo.
Pacific Area, Civic Auditorium, San Francisco, Calif.

THE AMERICAN NATIONAL RED CROSS
WASHINGTON, D. C.

OTHER VACANCIES

Southwestern state health department seeks 2 physicians for assignment to district health units, personally to conduct several small venereal disease clinics on a rotating schedule. Experience preferred but not required. Salary $3,000, plus actual travel allowance not to exceed $1,200. Write **Box V,** Employment Service, A.P.H.A.

Wanted: Supervisor of generalized public health nursing staff of 6 to 8 nurses. Beginning salary $175 per month, with opportunity for increase to $220 and travel expenses. Must be high school graduate, graduate of hospital of 100 beds, and must have at least 1 year's postgraduate study in public health nursing at a recognized institution, and

2 years' experience in general public health nursing under qualified supervision. Apply **Box L,** Employment Service, A.P.H.A.

The New Mexico State Department of Public Health will consider applications for the position of obstetrical consultant, Maternal and Child Health Division. Address inquiries to the State Department of Public Health, Santa Fe, N. M.

Bacteriologist with Ph.D. or equivalent and teaching experience wanted in western state university. Must be immune to military service call. Salary about $2,500. Write **Box A,** Employment Service, A.P.H.A.

Wanted: Nurse for county health work. Salary $1,800 per year with travel allowance (additional) of $500 per year. Address District Health Department 2, West Branch, Mich.

Wanted: Chemical or Ceramic Engineer or Geologist for Occupational Disease work, Division of Industrial Hygiene, State Board of Health, Raleigh, N. C.

POSITIONS WANTED

ADMINISTRATIVE

Teaching or administrative position desired by physician, aged 48. Experienced teacher in preventive medicine and public health, now employed at prominent medical school; 20 years' experience in municipal health administration and epidemiology. **A-491**

Physician, B.S., M.D., and M.S.P.H., University of Michigan, aged 35, experienced city-county health administration and as director university student health service. Will consider permanent responsible position offering good income. **A-492**

Physician with 25 years' full-time experience in public health administration is available for immediate appointment. Moderately hard of hearing; otherwise fully able. Salary $4,500 or better. **A-497**

Physician, M.D., C.P.H., aged 47, seeks position in administrative work. Experienced in venereal disease control and industrial medicine. **A-485**

Physician, aged 47, M.D., Creighton University, M.S.P.H., Michigan, experienced in school health and as director of county health unit, seeks position as administrator in state or local health department. **A-498**

Physician, aged 37, M.D., McGill, D.P.H., Toronto, experienced as health officer and director of public health training, seeks position in administrative work. **A-499**

WOMEN PHYSICIANS TRAINED IN PUBLIC HEALTH

Woman, aged 34, M.D., University of Basle, Switzerland, M.S.P.H., DeLamar Institute, Columbia University. U. S. citizen. Excellent references. Especially interested in industrial hygiene. **A-493**

Woman, aged 41, M.D., Columbia University, M.S.P.H., DeLamar Institute, experienced in epidemiology and research, seeks position offering administration experience. **A-494**

Woman physician, aged 48, M.D., University of Vienna. Excellent European pediatric experience. Seeks position in pediatrics, administration or statistical research. **A-495.**

Woman physician, M.D., Rush, M.P.H., Michigan, 13 years' experience in school medical service and administrative county health unit, seeks administrative position. New York area preferred. **A-500**

Woman physician, aged 29, M.D. Women's Medical, M.P.H. Johns Hopkins. Specially interested in industrial medicine and public health administration. Has had residency in tuberculosis. **A-501**

Mature woman physician, licensed in California, Minnesota and Indiana, desires to care for the aged, mentally disturbed, handicapped, epileptic, arthritic, etc., in the home or institution. **A-505**

HEALTH EDUCATION

Woman with master's degree in health education, 12 years' successful experience in public school and college teaching, administration and research. Will consider position in normal school, public schools, or in official or nonofficial health agencies. Prefers South or East. Available at once. **H-501**

INDUSTRIAL HYGIENE

Industrial hygiene chemist. Experienced in sampling, analysis of toxic industrial gases and fumes; petrographic dust analysis; dust counting; general toxicological analysis; chemical microscopy; also experienced in making industrial hygiene surveys, with knowledge of German, French, and Spanish. Six years' experience. Desires position. **I-457**

LABORATORY

Man, aged 28, A.B., M.S. in animal parasitology, Ph.D. in human parasitology and tropical diseases. Two years' experience in charge of parasitological diagnosis and research in state laboratory. Research publications; teaching experience. Desires teaching position in university with opportunity to do research. **L-463**

MISCELLANEOUS

Veterinary Doctor, M.P.H., University of Pennsylvania, aged 27, with 2 years of practice, seeks position in food, meat, milk or livestock sanitation with state or local health department. Also interested in teaching position with research facilities. **M-451**

Public Health Nurse with M.A. degree wishes position in health supervision and teaching in college or public school. West preferred. **M-452**

Administrative Assistant or Health Educator, woman, M.A., 10 years' experience in health agency offices; 7 years' teaching experience, writer on health and other subjects, experienced in independent research, some training in social work, some hospital experience. **M-453**

NEWS FROM THE FIELD

Criteria for Determination of Essential List of Public Health Physicians

THE Directing Board, Procurement and Assignment Service, has addressed to all State Chairmen for Physicians the following memorandum and has authorized its publication.

The Directing Board has approved the following recommendations made by the Advisory Committee on Public Health of which the members are: Carl V. Reynolds, M.D., State Health Officer, Raleigh, N. C., *Chairman;* Harry S. Mustard, M.D., DeLamar Institute of Public Health, New York, N. Y.; Reginald M. Atwater, M.D., Executive Secretary, American Public Health Association; Waller S. Leathers, M.D., Vanderbilt University, Nashville, Tenn.; and John L. Rice, M.D., Deputy Commissioner of Health, New York, N. Y., and President, American Public Health Association.

"A physician should be considered essential to civilian public health interests and, therefore, not available for military duty provided he comes within one of the two following categories:

"1. A full-time medical officer in charge of a health service of a governmental unit or administrative district, such as state, district, county, and city.

"2. Full-time heads or chiefs of administrative units within a health department. For example: tuberculosis, venereal diseases, maternal hygiene, infant care, epidemiology, vital statistics, etc.

"Methods of rendering health service differ throughout the states; public health problems vary with localities, population densities, and in terms of war industries, military centers, etc., which may create special problems where located. The committee, therefore, does not deem it feasible to submit any specific recommendations for nation-wide application as to the essentiality of full-time medical officers serving health departments in capacities other than those in the two groups set forth above.

"In view of these facts, this committee recommends that the designation of physicians as essential in capacities other than those described above be determined after conference between the administrative chief of the health department concerned and the State Chairmen of Procurement and Assignment Service with the provision that except under unusual circumstances, physicians under 37 years of age—except for those specified in paragraphs 1 and 2 above—should be released for military service, their places to be taken by older persons or by those not eligible for service with the armed forces. Special consideration, however, shall be given to trained health officers who have had two or more years of training and service in public health. Furthermore, some of these who may not be essential locally may be needed by the U. S. Public Health Service for service elsewhere.

"If a State Chairman considers a public health physician as available, he should state *when available.*"

Conference on Venereal Disease Control Needs in Wartime

VENEREAL disease and America's war effort will be discussed by high-ranking medical officers of the War and the Navy Departments, prominent physicians, health officers and others at a Conference in Hot Springs National

Park, Ark., October 21–24, 1942. Headquarters will be at the Arlington Hotel.

The Conference will be held under the auspices of the U. S. Public Health Service in conjunction with the Eighth Annual Meeting of the American Neisserian Medical Society. Surgeon General Thomas Parran will preside. State and local health officers, venereal disease control officers, practising physicians, and all others engaged in venereal disease control activities are invited.

Subjects for discussion will include venereal disease control measures influencing the war effort, epidemiology of syphilis and gonorrhea—1942, wartime venereal disease control education, research influencing the wartime venereal disease control program, and technics of venereal disease education.

Governmental, professional, and health organizations to be represented at the Conference include: the War Department, the Navy Department, the Social Protection Section of the Office of Defense Health and Welfare Services, the American Medical Association, the American Neisserian Medical Society, the American Social Hygiene Association, state and local health departments, and the U. S. Public Health Service. This Conference has been set immediately preceding the 71st Annual Meeting of the American Public Health Association in St. Louis, October 27 to 30, in the expectation that many persons would be able to attend both Conferences.

SENATE GETS BILL FOR MORE CHILD AID

PRESIDENT ROOSEVELT asked Congress on August 25 to amend the Social Security Act to make more money available to the Children's Bureau for "special needs of mothers and children arising from war conditions." Legislation to accomplish this was immediately introduced.

The President pointed out that war needs have made such heavy demands on the funds available through the Children's Bureau that additional funds, now prohibited by limitations written into the Social Security Act, must be made available through the amendment of the Act.

The amendment would raise the monetary restrictions imposed on the Children's Bureau for child welfare and would give the bureau permission to send special personnel into emergency areas.

The sum needed by the Children's Bureau until next July would be about $7,500,000. According to a statement issued by Katharine Lenroot, head of the bureau, this sum represents almost double the present amount expended yearly and would be distributed as follows:

For more adequate health and welfare supervision in war industry boom towns—$4,250,000

For maternity care for wives of service men—$750,000

For child welfare workers to be stationed in trailer camps, war industry communities and other overcrowded areas—$2,000,000

Miss Lenroot pointed out that the allocation of money for the wives of service men was a new departure brought about by the requests of about 38 states for financial help in providing adequate maternity care for these women. One of the reasons for naming such a large sum for child welfare workers, Miss Lenroot said, was that the problem of juvenile delinquency was a growing and dangerous one in crowded areas.

The money will be disbursed through grants-in-aid to the states. President Roosevelt said:

"I make these suggestions for federal assistance to the states in full appreciation of the fact that the degree to which children are safeguarded in wartime depends chiefly upon the parents in our homes, the teachers

in our schools, and the citizens of our communities.

"It is my hope that in making our supreme war effort, parents and citizens will be at all times on guard to see that children are safeguarded to the utmost from the dangers of wartime and equipped to use and to cherish the freedom which we shall make secure for them."

Under the terms of the amendment, all supplementary appropriations obtained by the Children's Bureau for war work will be allotted to the states on the basis of need and the money will not have to be matched in amount by state funds.

NUTRITION FOUNDATION PROGRAM

THE Nutrition Foundation, Inc., New York, N. Y., an organization sponsored by food manufacturing concerns, announced recently through George A. Sloan, its President, the receipt of additional funds of $75,000 from six new member organizations for the purpose of nutrition research, bringing the total of the Foundation's funds available for this purpose to $923,500.

At the same time, Charles Glen King, Ph.D., Scientific Director of the Foundation, announced the establishment of *Nutrition Reviews*, a monthly journal of interpreted progress in the science of nutrition. Its purpose will be "to bridge the gap between basic research findings and their acceptance on the part of those who deal with the public and to enable the public to keep abreast of current progress and to have available an unbiased, authoritative review of current literature."

The editor of the new publication will be Frederick J. Stare, M.D., Assistant Professor of Nutrition and Biochemistry at Harvard Medical School and the Harvard School of Public Health. According to Dr. King, *Nutrition Reviews* will be so edited as to merit the full confidence of the medical and other professions, including that of dentistry, nutrition, health workers in general, teachers, dietitians, science writers, and food technologists. Assistant editors will include Esther Batchelder, Bureau of Home Economics, Washington, D. C.; Franklin C. Bing, Council on Foods and Nutrition, American Medical Association; R. Adams Dutcher, Pennsylvania State College; Robert S. Goodhart, Nutrition Division, Office of Defense, Health and Welfare; Carl V. Moore, Washington University; and Elmer J. Stotz, Harvard University.

The editorial advisory committee of *Nutrition Reviews* will consist of Reginald M. Atwater, M.D.; Samuel W. Clausen, M.D.; George R. Cowgill, Ph.D.; Conrad A. Elvehjem, Ph.D.; J. Murray Luck, Ph.D.; James S. McLester, M.D.; Henry C. Sherman, Ph.D.; Russell M. Wilder, M.D.; and John B. Youmans, M.D.

RESOLUTIONS FROM THE CANADIAN PUBLIC HEALTH ASSOCIATION

AT its annual meeting in Toronto last June, the Canadian Public Health Association passed the following resolutions:

1. Be it resolved that the thanks of this Association be extended to the American Public Health Association for making possible, in coöperation with the W. K. Kellogg Foundation of Battle Creek, Mich., the conduct of the 5th Annual Canadian Rural Health Conservation Contest; and for their coöperation with the Metropolitan Life Insurance Company in providing, for the second year, the Canadian City Health Conservation Contest.

2. Be it resolved that the Canadian Public Health Association express to the American Public Health Association its appreciation of the Manitoba Health Study as a contribution to the promotion of provincial health departments in Canada.

PUBLIC HEALTH AS A FOUNDATION FOR PUBLIC MORALE

THE testimony of a panel of persons engaged in public health who were invited to appear before the Tolan Committee of the House of Representa-

tives, January 15, 1942 (*American Journal of Public Health*, February, 1942, pages 226–228), will be found available in Part 25 of the Washington Hearings of the Tolan Committee "Testimony relating to the maintenance of civilian morale," pages 9834–9884. The Hearings document the relationships between public health and morale in this country and in England and may be used as source material for those supporting health budgets, etc., during the emergency.

Following this testimony, an excellent statement on the activities and operations of the British Ministry of Health is included with the statement of the Right Honorable Malcolm MacDonald, High Commissioner for Great Britain in the Dominion of Canada. Mr. MacDonald during the blitzkrieg was British Minister of Health.

CLEVELAND HEALTH MUSEUM RECEIVES GRANT

FOR the second time the Cleveland Health Museum has received a grant from the Thomas H. White Trust Fund, in the amount of $1,100. This grant has been made to establish a permanent exhibit on nutrition and health at the Museum. According to Dr. Bruno Gebhard, Director, the opening of the exhibit is scheduled for the early part of January, 1943.

KANSAS STATE BOARD OF HEALTH ELECTIONS

FORREST L. LOVELAND, M.D., Topeka, and Hugh A. Hope, M.D., Hunter, have been appointed members of the Kansas State Board of Health. George I. Thatcher, M.D., of Waterville, was reëlected President of the Board and Harry L. Aldrich, M.D., Caney, was elected Vice-President at a recent meeting. Floyd Z. Beelman, M.D., Topeka, who has been Acting Secretary, was appointed as Secretary and Executive Officer. William Fred Mayes, M.D., Kansas City, was appointed the Director of Child Hygiene, and Harry R. Ross, M.D., Topeka, was appointed Medical Consultant to the Board.

STANDARDS FOR MATERNITY CARE AND EMPLOYMENT OF MOTHERS IN INDUSTRY

THE Children's Bureau and the Women's Bureau of the U. S. Department of Labor have issued a statement on standards for maternity care and employment of mothers in industry. Copies can be obtained from the Children's Bureau in Washington.

It is the opinion of the Bureau and a group of consultants that the labor situation in the United States does not now necessitate the recruitment or employment of pregnant women or women with infants. However, because some women who are pregnant or who have young children may find it necessary to seek employment, a statement of policy has been formulated to serve as a working basis for those concerned with the problem.

The statement outlines the facilities for adequate prenatal medical care, recommends that pregnant women should not be employed between 12 midnight and 6 A.M., nor more than 8 hours a day or 48 hours per week. It is recommended that pregnant women should not be employed in occupations involving heavy lifting or continuous standing. Other conditions involving accident risks and exposure to toxic substances are listed. A minimum of 6 weeks' leave before delivery is recommended and at least 2 months' leave after delivery.

MICHIGAN DEPARTMENT OF HEALTH HAS NEW BUILDING

THE *Journal of the A.M.A.* announces that a new building has been erected for the State Department of Health on the northwest edge of

Lansing. The four story construction was financed by state funds of $135,000, supplemented by WPA grants of labor and material. Eleven of the twelve bureaus of the state department are located in the new building. Laboratory personnel will continue to occupy the former quarters.

CLARA ELIZABETH FUND FOR MATERNAL HEALTH

A RECENT decision of the Trustees of the Clara Elizabeth Fund for Maternal Health, Flint, Mich., separates the Fund's activities from those of the Flint Department of Health. Heretofore the program of the Fund has been directed by Flint's Executive Health Officer. The Clara Elizabeth Fund was created by a gift of General William S. Knudsen in 1937, when he was President of General Motors, to improve maternal health conditions in Flint and Genesee County. The classes designed to prepare both men and women for the responsibilities of parenthood were begun in 1939. Several meetings have been held each week since that time. More than 2,500 women and over 1,200 men have been enrolled in this unique educational program. The new arrangement decided upon by the Trustees does not alter the educational emphasis that has been the Fund's policy from the beginning. David B. Treat, who was Director of Health Education for the Fund, has been appointed its Director.

DIRECTOR OF MENTAL HYGIENE APPOINTED

DR. GERHARD B. HAUGEN of Portland, Ore., has been appointed Director of the Division of Mental Hygiene, established last year under the supervision of the U. S. Public Health Service. The new unit was set up by Dr. Curtis R. Chaffin, Portland, of the Public Health Service, who has been Acting Director. Dr. Chaffin is now transferred to the U. S. Marine Hospital at Ellis Island, N. Y. Dr. Haugen is a graduate of the University of Oregon Medical School and has recently completed a year at Johns Hopkins University School of Hygiene and Public Health.

INDIANA SERUM CENTER CLOSED

THE Indiana State Department of Health has decided to close its serum centers, now located in different sections of the state, and distribute serum directly from the State Board of Health. The serum will be available on request and it is believed the new plan will not interfere with prompt delivery. This decision was made on the basis of a survey and the opinion of the pneumonia control committee of the State Medical Association.

"SNAPSHOTS OF DEATH"

THE U. S. Bureau of the Census, Washington, has announced the Mortality Summaries, a new series of releases in the *Vital Statistics Special Reports*, which will present statistical summaries for the more important causes of death. Each mortality summary will deal with a particular disease or cause of death and will give concisely in a few pages most of the salient facts about that selected cause. Each Mortality Summary contains in a compact and convenient 4 page release the essential information about one particular cause of death. Included in the tables are trends for the period 1900–1940, age-specific death rates, death rates by sex and race, death rates by month, contributory causes of death, death rates by place of residence, and other features.

Among the special reports already issued and available from the Bureau of the Census are Mortality Summaries on all causes of death, typhoid and paratyphoid fever, scarlet fever, whooping cough, diphtheria, tuberculosis, dysen-

tary, malaria, syphilis, measles, cancer, diabetes, exophthalmic goiter, pellagra, alcoholism, intracranial lesions of vascular origin, diseases of the heart, chronic rheumatic diseases, bronchitis, pneumonia and influenza.

NEW YORK UNIVERSITY COURSES IN INDUSTRIAL SAFETY

IN coöperation with the Greater New York Safety Council and the Newark Safety Council, the New York University Center for Safety Education will conduct during the 1942–1943 school year four special courses which have been designed to provide advanced training in industrial accident prevention and first-aid instruction for insurance and industrial engineers, inspectors, and others concerned with problems of industrial safety.

Instructors for the courses will include leaders in industrial safety and hygiene. The course coördinators will be Dr. Walter Cutter and C. Don Modica of the staff of the Center for Safety Education.

PERSONALS

Central States

ROLAND M. ATHAY, M.D., of Detroit, Mich., was appointed Medical Coordinator for the Wayne County Department of Social Welfare on May 26.

ALBERT C. BAXTER, M.D.,* of Springfield, Ill., formerly Illinois State Health Officer, has been appointed State District Health Officer with headquarters in Pana.

WILLIAM H. CAMERON, Chicago, Ill., Managing Director of the National Safety Council for the last 30 years, has retired, and has been succeeded by NED H. DEARBORN, PH.D., of New York, N. Y., who has been named Executive Vice-President and Managing Director. Dr. Dearborn has been Dean of the Division of General Education of New York University since 1934 and has been actively interested in accident prevention, having been Vice-President for Education of the National Safety Council for two years.

GARRETT J. FLANAGAN, M.D., of Kaukauna, Wis., has been appointed City Health Officer, to succeed CHARLES D. BOYD, M.D.

DENMAN T. GAMMELL, M.D., of Ulysses, Kans., has been named Health Officer of Grant County.

H. H. GERSTEIN, CH.E.,* of Chicago, Ill., has entered the Sanitary Corps of the U. S. Army, as of August 31. He was Sanitary Engineer in charge of the water safety control section of the Bureau of Engineering of the City of Chicago for the last 17 years.

GILSDORF GROFF, who has just completed his training for a Master of Public Health degree at the University of Michigan, has been appointed Engineer for the Regional Health Service at Valley City, N. D. With the exception of a 9 months' educational leave, Mr. Groff has been with the North Dakota State Department of Health since 1938 as Engineer in Charge of Laboratory Service.

G. R. HARRIS, formerly Superintendent of Public Health for the City of Detroit, Mich., has been appointed Hospital Administrator at the Herman Kiefer Hospital, Detroit; and FRANKLIN H. TOP, M.D., D.P.H.,* Director of the Division of Communicable Diseases and Epidemiology of the Detroit City Department of Health and the Hospital, has been named Medical Director.

ELMER L. LAMPE, M.D., of Bellevue, Ia., has been appointed Health Officer of Lamotte.

JOHN L. LAVAN, M.D.,* Health Commissioner of Toledo, Ohio, has been granted a leave of absence to accept active duty as Commander in the

* Fellow A.P.H.A.
† Member A.P.H.A.

Medical Corps of the U. S. Navy.

OTTO F. C. LEHMBERG, M.D., Columbia City, Ind., has entered the Army Medical Corps and has been succeeded as Health Officer of Whitley County, by ARTHUR LEITER, M.D., of Columbia City.

HERMAN M. LYNCH, M.D., has been appointed Health Officer of West Bend, Wis., filling the vacancy caused by the resignation of WILLIBALD J. WEHLE, M.D.

CARL W. PLOWMAN, M.D., of Jewell, Kans., has been appointed Health Officer for Jewell County, succeeding the late SPENCER B. DYKES, M.D., of Esbon.

SHERMAN T. ROGERS, M.D., has been appointed Health Officer of New Albany, Ind., succeeding ADDIS N. ROBERTSON, M.D., resigned.

VIOLA RUSSELL, M.D.,† who has been Director of Maternal and Child Hygiene of the North Dakota State Department of Health, Bismarck, N. D., since January 1, 1940, has resigned to accept the position of Director of Maternal and Child Hygiene for the Vermont State Department of Health.

FLORENCE LEE SCOTT has just been appointed Orthopedic Nursing Consultant by the North Dakota State Department of Health and the State Board of Public Welfare, according to Dr. F. J. Hill, Acting State Health Officer, and E. A. Willson, Executive Director of the State Welfare Board. She will divide her services equally between the two state departments. Mrs. Scott was Public Health Nurse for LaMoure County from 1939 to 1941, at which time she was granted a leave for a special course in orthopedic nursing at Western Reserve University.

E. L. SEDERLIN, M.D.,† formerly Health Officer for Fargo, N. D., will be the Regional Health Officer at Valley City, N. D., replacing R. G. WHITE, M.D.,* now located at Bismarck.

JEROME SVORE, Sanitary Engineer for the Regional Health Service at Valley City, N. D., has been appointed State Milk Sanitary Engineer with the North Dakota State Department of Health at Bismarck. Mr. Svore joined the State Health Department staff November 8, 1938. Prior to his appointment with the Health Department, he was Assistant Construction Field Engineer for 13 counties in the Mandan District of the WPA.

ARTHUR F. WEYERBACHER, M.D., has been appointed to the Indianapolis Board of Health for a 4 year term succeeding GEORGE W. KOHLSTAEDT, M.D., resigned.

R. G. WHITE, M.D.,* Health Officer for the Regional Health Service, at Valley City, N. D., has been appointed Director of Maternal and Child Hygiene for the North Dakota State Department of Health, as of September 15. Dr. White came to North Dakota on September 1, 1937, from Detroit, Mich., where he served as School Health and Medical Coordinator for the Detroit Health Department from 1930 to 1935, and Director of the School Health Service at Ann Arbor, Mich., from 1935 to 1937. He will be located at Bismarck.

EDWARD W. ZEMAN, M.D., has been appointed Health Director of Hibbing, Minn.

Eastern States

TRAVIS P. BURROUGHS, M.D., M.P.H.,* Secretary of the New Hampshire State Board of Health, Concord, has resigned, effective August 31, and has been commissioned a Surgeon in the Reserve of the U. S. Public Health Service, where he is now on

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† Member A.P.H.A.

duty. He is succeeded by ALFRED LEO FRECHETTE, M.D., M.P.H.†

BERNARD D. DAITZ, M.S.P.H.,† formerly Field Consultant for the New Jersey Tuberculosis League, Newark, N. J., is on active duty with the U. S. Army, and is at the 64th Station Hospital, Fort Jackson, S. C.

ALFRED LEO FRECHETTE, M.D., M.P.H., for some years Deputy State Health Officer in New Hampshire, has been appointed by the New Hampshire State Board of Health as Secretary of the State Board of Health, succeeding TRAVIS P. BURROUGHS, M.D., M.P.H.,* resigned. Dr. Frechette is a graduate in medicine from the University of Vermont and of the Harvard School of Public Health, from which he received the M.P.H.

CHARLES E. GILL, M.D.,† State District Health Officer, Massachusetts State Department of Health, Westfield, has been inducted as Major in the Army Medical Corps and is temporarily stationed at Lovell General Hospital, Camp Devens, Mass.

JOHN B. HOZIER, M.D., of Boston, Mass., has been detailed as Acting Director of the Division of Genito-infectious Diseases in the Massachusetts Department of Health. He succeeds ERNEST B. HOWARD, M.D., M.P.H.,† who is now a special venereal disease control officer for the U. S. Public Health Service.

GUSTAVUS H. KLINCK, JR., M.D., of Troy, N. Y., was chosen President of the New York State Association of Public Health Laboratories, at its meeting in Schenectady, May 18.

PAUL O. KOMORA, of New York, N. Y., was recently appointed Assistant Secretary of the New York State Department of Mental Hygiene, Albany, N. Y., effective August 1. He had been Associate Secretary of the National Committee for Mental Hygiene.

ESMOND R. LONG, M.D., PH.D.,* Professor of Pathology, University of Pennsylvania School of Medicine, Philadelphia, Pa., and Director of the Laboratories of the Henry Phipps Institute, has recently been elected an honorary member of the Society for the History of Medicine, Buenos Aires, Argentina.

STEPHEN V. LUDDY, D.D.S., M.P.H.,† of Philadelphia, Pa., has been appointed Dental Director for the North Dakota Public Health Department, Bismarck, N. D., effective July 15. Dr. Luddy graduated February 15, 1941, from the School of Public Health of the University of Pennsylvania, where he received the degree of Master of Public Health.

DR. GEORGE W. PATTERSON, Professor in Bacteriology and Director of Athletics at the Philadelphia College of Pharmacy and Science, Philadelphia, Pa., was chosen President of the Alumni Association of the College, for the ensuing year, at the recent annual meeting.

REUBEN F. REIDER, M.D., D.P.H.,† of New York, N. Y., U. S. Public Health Service, has been named Health Officer of the Champaign-Urbana Health District, succeeding WALTER C. EARLE, M.D.,* of Champaign, who has been granted a leave of absence to do special work for the federal government, it is reported.

EDWARD S. ROGERS, M.D., M.P.H.,* Assistant Commissioner, New York State Department of Health, Albany, has been made Director of the Office of War Nutrition Services in the State War Council, Albany, as an additional assignment from his duties in the Department of Health. The State War Council includes the interests of 6 departments or other agencies of the State Government as they participate in an extensive

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† Member A.P.H.A.

nutrition program. The aim is immediate concentration of all available resources and personnel on the problem of nutrition of war workers in industry.

FREDERICK FULLER RUSSELL, M.D.,* Professor of Preventive Medicine and Epidemiology, emeritus, Harvard Medical School, Boston, Mass., was awarded the honorary degree of Doctor of Science by the University of Rochester, N. Y., at its annual commencement exercises, May 11.

DAVID D. RUTSTEIN, M.D.,† who has been Chief of the Cardiac Bureau of the New York State Department of Health, Albany, has been appointed on the staff of the Office of Civilian Defense, Medical Division, Washington, to organize instruction for physicians as Medical Gas Officer.

JOSEPH J. SMITH, M.D., of Easton, Conn., has been named Health Officer of Easton, succeeding WILLIAM H. COON, M.D.

FREDERICK J. STARE, M.D.,† has been announced by C. Sidney Burwell, M.D., Dean of the Harvard Medical School, Boston, Mass., as Assistant Professor of Nutrition. Dr. Stare is a graduate of the University of Chicago, 1940.

VESTA L. STONE, R.N.,† Executive Secretary of the Northern Worcester County Public Health Association, has presented her resignation, to be effective when her successor has been installed.

LAWRENCE M. TIERNEY, M.D., has been appointed Health Officer of West Haven, Conn., succeeding EUGENE N. COZZOLINO, M.D.

MYRON E. WEGMAN, M.D.,† formerly of San Juan, Puerto Rico, and now with the New York City Bureau of Child Hygiene, will direct a training unit at the Kips Bay-Yorkville Health Center to train new physicians employed by the Bureau to replace staff members called into military service.

ISRAEL WEINSTEIN, M.D.,* Assistant Director, Bureau of Health Education, New York City Department of Health; Major, Medical Reserve Corps, U. S. Army, is on military leave from the Department of Health for active service in the Army.

Southern States

N. G. ANGSTADT, M.D.,† of Fayetteville, has been made Director of the State Bureau of County Health Work of the West Virginia State Health Department, Charleston. Dr. A. M. Price has been Acting Director of this bureau since the Director, Dr. Bruce H. Pollock, joined the Navy. Dr. Angstadt has been Director of the Fayetteville County Health Department for several years. He is being succeeded by DON V. HATTON, M.D., formerly Director of the Wetzel County Health Department and recently returned from Johns Hopkins, where he received his M.P.H. degree.

WALLACE E. BAKER, M.D., of Petersburg, Va., has been appointed Assistant Epidemiologist in the Division of Venereal Disease Control of the Virginia State Department of Health.

BESSIE MAE BEACH, M.D.,† Associate in charge of the Division of Child Hygiene of the Alabama State Department of Health, has been appointed Regional Medical Consultant in maternal, child health and crippled children services of the Children's Bureau of the U. S. Department of Labor, with headquarters in New Orleans, La.

RALPH G. BEACHLEY, M.D.,* of Arlington, Va., who has been Director of Public Welfare and Health in Arlington County since 1938, has now been appointed Assistant Chief Medical and Liaison Officer for the metropolitan area, succeeding the late DR.

* Fellow A.P.H.A.
† Member A.P.H.A.

WILLIAM B. KING. He was recently appointed Regional Consultant on Emergency Medical Service for northern Virginia.

PAUL W. BOWDEN, M.D., M.P.H.,† Acting Health Officer of Charlotte County, has been appointed Epidemiologist for Richmond, Va.

LOUIS A. BREFFEILH, M.D.,† of Marksville, La., head of the Avoyelles Parish Health Unit, has been appointed in charge of the Iberia Unit, with headquarters at New Iberia, succeeding CHRISTOPHER L. MENGIS, M.D.,† who recently became President of the Louisiana State Board of Health.

DAVID E. BROWN, M.D., of New Orleans, La., has been appointed State Health Officer and President of the Louisiana Board of Health, succeeding CHRISTOPHER L. MENGIS, M.D.,† of New Orleans. Dr. Mengis will continue his association with the Board as Assistant State Health Officer, and Director of the Division of Local Health Service. Dr. Brown is a graduate of Memphis Hospital Medical College.

T. H. BRUCE, M.D., C.P.H.,† Director of the Hancock County Health Department, West Virginia State Department of Health, has resigned his position to enter the Army.

WILLIAM G. CARNATHAN, M.D., of Henderson, Tex., has been appointed Health Officer of Rusk County, succeeding JESSE E. ROSS, of Henderson, who has accepted a commission in the U. S. Navy.

FRANCIS B. CARROLL, M.D., D.M.D., M.P.H.,† recently Camp Epidemiologist at Fort Knox, Ky., was transferred on June 15 to the Preventive Medicine Section, Surgeon General's Office, War Department, Washington, D. C.

JOHN S. CHAMBLEE, M.D., of Windsor, N. C., Health Officer for Bertie and Chowan Counties, will take over the work in Gates County, succeeding THOMAS G. FAISON, M.D.,† of Winton, Health Officer for Hertford and Gates Counties, who has entered active service.

WILLIAM E. CHAPIN, M.D., of Richmond, Va., has been named to succeed WALLACE E. BAKER, M.D., of Petersburg, in his former position of Field Epidemiologist for the Camp Lee area, with headquarters in Petersburg.

FRANCIS J. CLEMENTS, M.D.,† of Stony Creek, Va., has been named Health Officer of the new health district comprised of Dinwiddie County and Sussex-Prince George Counties.

ERNEST A. COOK, M.D.,† recently Director of a health unit in Alabama, has been appointed Director of the Okaloosa-Walton County Health Department, with headquarters at DeFuniak Springs, Fla.

GEORGE W. CRESWELL, M.D., has been appointed a special consultant in the Division of Venereal Diseases, U. S. Public Health Service, Washington, D. C.

J. T. DUNCAN, M.D., of Columbia, Ky., who has been Health Officer of Adair County since 1937, has resigned to become Director of the Bureau of Tuberculosis of the West Virginia State Department of Health, Charleston, effective July 1. Dr. Duncan will have charge of the Mobile Tuberculosis X-ray Unit operated by the Division of Communicable Disease Control of the Health Department.

BEVERLY L. HOLLADAY, M.D., of Wytheville, Va., has resigned as Health Officer of Wythe County, effective April 1.

DANIEL HOPE, JR., M.D., of Lawrenceville, Va., formerly Assistant Health Officer of the Brunswick-Greenville-Mecklenburg Health District, has

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† Member A.P.H.A.

been appointed Health Officer of the Alleghany-Botetourt Health District, with offices in Covington, succeeding WYATT E. ROYE, M.D.,† of Covington, who has been transferred to the Tuberculosis Outpatient Service of the Virginia State Health Department, at Richmond.

THOMAS H. JOHNSTON, M.D., formerly of Douglas, Ga., has been appointed Director of the Ontonagon-Baraga County Health Unit, succeeding ROLLA J. SHALE, M.D., M.S.P.H.,† of Ontonagon, who has gone to Florida.

GILBERT L. KELSO, B.A.† has been named sanitary chemist in charge of stream pollution with the State Water Commission of West Virginia. Mr. Kelso, who has recently returned from Minnesota where he did postgraduate work, takes the place of KENNETH H. WATSON, who is now in the Army. Mr. Kelso was formerly a member of the staff of the West Virginia Public Health Training Center at Morgantown.

J. H. MASON KNOX, JR., M.D.,* of Baltimore, Md., who recently retired as Director of the Maryland State Bureau of Child Hygiene, has been appointed Consultant in Child Hygiene. At a recent dinner marking his retirement, Dr. Knox was presented by his colleagues with a bound portfolio of his own work, including reprints of articles, addresses and reports of special studies.

L. A. MACLEAN, M.D., D.P.H.,† Director of the Monongalia County Health Department, West Virginia Department of Health, Morgantown, has been transferred to the Brooke County Health Department, succeeding DR. W. H. BOOHER, who has gone into the Army. Dr. MacLean will be replaced by DR. W. B. BAILEY, who has been loaned to the West Virginia State Health Department by the U. S. Public Health Service.

FRANK A. MOORE, M.D.,† of Jackson, Tenn., has resigned as Regional Health Officer of West Tennessee, to become a captain in the U. S. Army Medical Corps.

PAUL Q. PETERSON, M.D.,† of Hardinsburg, Ky., has been transferred from his position as Health Officer of Hancock to a similar position in Warren County. He will succeed LEWIS FINE, M.D., of Bowling Green, who is retiring from the work because of ill health.

LESTER M. PETRIE, M.D.,† of Atlanta, Ga., has been named Director of the Industrial Hygiene Service recently created in its Division of Preventable Diseases by the Georgia State Department of Health.

STANLEY BROOKS RUSSELL, A.B.,† Statistician and Assistant Director of the Bureau of Records and Vital Statistics, Jefferson County Board of Health, Birmingham, Ala., has been commissioned First Lieutenant in the Army of the United States, and is now serving in the Bureau of Preventive Medicine, in the Office of the Surgeon General.

WILSON T. SOWDER, M.D., M.P.H.,† of Tampa, Fla., U. S. Public Health Service, who was Health Officer of Hillsborough County, has been placed in charge of the Bureau of Venereal Disease Control of the Florida State Board of Health. He succeeds LEO C. GONZALES, M.D., of Jacksonville, who has been in charge of the work for the last 4 years and who, it is reported, was to retire on May 1 to engage in private practice in Tampa.

J. FRANK TAYLOR, of Martin, Tenn., has been appointed State Supervisor of Health and Physical Education, to carry on the physical education program of the Tennessee State Department of Education.

* Fellow A.P.H.A.
† Member A.P.H.A.

WILLIE B. TRAMMELL, M.D., of Statham, Ga., has been named Health Commissioner in the newly established unit in Gwinnett County, with headquarters in Lawrenceville.

FRED J. WAMPLER, M.D.,* Professor of Preventive Medicine at the Medical College of Virginia, Richmond, Va., since 1928, has been named Professor of Preventive and Industrial Medicine.

Western States

FRANCIS RHOADS has resigned his position as Director of Vital Statistics with the State of Washington Health Department, Seattle, to accept a position as Director of the Division of Vital Statistics in the West Virginia State Health Department, effective July 6.

CHARLES E. SHEPARD, M.D.,* Professor of Hygiene and Director of Student Health at Stanford University School of Health, Palo Alto, Calif., has been called to active duty with the U. S. Public Health Service with the title of Surgeon, and is attached to the staff of FRED T. FOARD, M.D.,* San Francisco, Calif.

HAROLD B. STOUT, M.D., formerly of Pateros, Wash., has been appointed Health Officer for Douglas County, Ore.

Hawaii

KUM PUI LAI has been appointed Acting Executive Secretary of the Territorial Tuberculosis Association, Territory of Hawaii, it has been announced.

THEODORE R. RHEA, C.P.H.,† left his position, August 1, with the Tuberculosis Association of the Territory of Hawaii, to become Director of Palama Settlement. This position was originally held by PHILIP S. PLATT, C.P.H., PH.D.*

Puerto Rico

ANTONIO FERNOS ISERN, M.D., has been appointed as Commissioner of Health of Puerto Rico as of August 1, it has been announced. Dr. Fernos was Commissioner of Health of Puerto Rico for a period ending in 1933. He succeeds EDUARDO GARRIDO MORALES, M.D., DR.P.H.,* who has been Commissioner since 1933 until his recent resignation to enter the armed forces of the United States as a Major in the Medical Corps. ACOSTA VELARDE, M.D., was Acting Commissioner of Health during July.

DEATHS

ALLEN JONES JERVEY, JR., M.D., of Tryon, N. C., formerly District Health Officer for Rutherford and Pope Counties, S. C., 1st Lieutenant, Medical Reserve Corps, U. S. Army, died June 17 somewhere in the Pacific of gunshot wounds.

WINFIELD CAREY SWEET, M.D., of New York, N. Y., since 1921 a staff member of the International Health Division, Rockefeller Foundation, who has worked in China, Australia, Ceylon, and India, died May 20 in Bolivia of heart disease.

CONFERENCES AND DATES

American Academy of Ophthalmology and Otolaryngology. Chicago, Ill. October 11–14.

American Academy of Physical Medicine. Boston, Mass. October 14–17.

American Association for the Advancement of Science. New York, N. Y. December 28–January 2.